

Model 1

Answer the following questions :

1 Choose the correct answer from those given :

1 The point (– 3 , 4) lies in the .... quadrant.

(a) first (b) second (c) third (d) fourth

2 The positive square root of mean of the squares of deviations of values from its arithmetic mean is called ....

(a) the range. (b) the arithmetic mean.

(c) the standard deviation. (d) the mode.

3 If 3 a = 4 b , then a : b = ...

(a) 3 : 4 (b) 4 : 3 (c) 3 : 7 (d) 4 : 7

4 If n (X) = 2 , n (Y^2) = 9 , then n (X × Y) = ...

(a) 6 (b) 18 (c) 11 (d) 7

5 The range of the set of the values : 7 , 3 , 6 , 9 and 5 is ....

(a) 3 (b) 4 (c) 6 (d) 12

6 If y ∝ X and y = 2 when X = 8 , then y = 3 when X = ...

(a) 16 (b) 12 (c) 24 (d) 6

2 [a] If X × Y = {(2 , 2) , (2 , 5) , (2 , 7)}

, **find :** 1 Y 2 Y × X

[b] If a , b , c and d are proportional , **prove that :** $\frac{a}{b-a} = \frac{c}{d-c}$

3 [a] If X = {2 , 3 , 5} , Y = {4 , 6 , 8 , 10} and R is a relation from X to Y where "a R b" means "2 a = b" for all a ∈ X , b ∈ Y

1 Write R and represent it by an arrow diagram.

2 Show that R is a function.

[b] Find the number that if we add it to each term of the ratio 7 : 11 it becomes 2 : 3

4 [a] If $X = \{1, 3, 5\}$ and R is a function on X, where $R = \{(a, 3), (b, 1), (1, 5)\}$

, find :

1. The range of the function.
2. The value of a + b

[b] If $y \propto \frac{1}{X}$ and $y = 3$ when $X = 2$

, find :

1. The relation between X and y
2. The value of y when $X = 1.5$

5 [a] Represent graphically the function $f : f(X) = (X - 3)^2$, $X \in [0, 6]$, from the graph deduce the vertex of the curve, the minimum value of the function and the equation of the axis of symmetry.

[b] Calculate the arithmetic mean and the standard deviation of the set of values : 8, 9, 7, 6 and 5

Model 2

Answer the following questions :

1 **Choose the correct answer from those given :**

1. The point (3, 4) lies in the .... quadrant.

   (a) first (b) second (c) third (d) fourth

2. .... is one of the measures of the dispersion.

   (a) The median (b) The arithmetic mean

   (c) The standard deviation (d) The mode

3. The third proportion of the two numbers 3 and 6 is ....

   (a) $\frac{1}{2}$ (b) 9 (c) 2 (d) 12

4. If $n(X) = 2$, $n(Y \times X) = 6$, then $n(Y^2) =$ ....

   (a) 4 (b) 9 (c) 16 (d) 12

5. The range of the set of the values : 7, 3, 6, 9 and 5 is ....

   (a) 3 (b) 4 (c) 6 (d) 12



6 If $x\,y = 7$, then $y \propto$ ....

(a) $\frac{1}{x}$ (b) $x - 7$ (c) x (d) $x + 7$

2 [a] If $X = \{2 , 5\}$, $Y = \{1 , 2\}$, $Z = \{3\}$

, **find :** 1 $n\,(X \times Z)$

2 $(Y \cap X) \times Z$

[b] If b is the middle proportional between a and c , **prove that :** $\frac{a - b}{a - c} = \frac{b}{b + c}$

3 [a] If $X = \{1 , 3 , 4 , 5\}$, $Y = \{1 , 2 , 3 , 4 , 5 , 6\}$ and R is a relation from X to Y where "a R b" means "$a + b = 7$" for all $a \in X$, $b \in Y$

1 Write R and represent it by an arrow diagram.

2 Show that R is a function.

[b] If $5\,a = 3\,b$, **find the value of :** $\frac{7\,a + 9\,b}{4\,a + 2\,b}$

4 [a] If $f\,(x) = 4\,x + b$ and $f\,(3) = 15$, **find the value of :** b

[b] If $y \propto x$, $y = 6$ when $x = 3$, **find :**

1 The relation between x and y

2 The value of y when $x = 5$

5 [a] Represent graphically the function $f : f\,(x) = 4 - x^2$, $x \in [-3 , 3]$, from the graph deduce the vertex of the curve , the maximum value of the function and the equation of the axis of symmetry.

[b] The following frequency distribution shows the number of children of some families in a new city :

Number of children	0	1	2	3	4	**Total**
Number of families	6	15	40	25	14	**100**

Calculate the mean and the standard deviation of the number of children.



Model for the merge students

Answer the following questions :

1 Complete :

1. The point (5 , 3) lies in .... quadrant.
2. $n(X) = X^3 + 8$ is called a polynomial of .... degree.
3. The range of the set of the values : 4 , 14 , 25 and 34 is ....
4. If $y = 2X$, then $y \propto$ ....
5. If $X = \{2, 4, 6\}$, then $n(X^2) =$ ....
6. If $(a, 3) = (6, b)$, then $a + b =$ ....

2 Choose the correct answer from those given :

1. If $Xy = 7$, then $y \propto$ ....

   (a) $\frac{1}{X}$ (b) $X - 7$ (c) X (d) $X + 7$

2. If 2 , 3 , 6 and X are proportional , then $X =$ ....

   (a) 9 (b) 18 (c) 12 (d) 3

3. If $2a = 5b$, then $\frac{a}{b} =$ ....

   (a) $\frac{-5}{2}$ (b) $\frac{-2}{5}$ (c) $\frac{2}{5}$ (d) $\frac{5}{2}$

4. .... is one of the measures of the dispersion.

   (a) The arithmetic mean (b) The range
   (c) The mode (d) The median

5. If $n(X) = 5$, $n(X \times Y) = 10$, then $n(Y) =$ ....

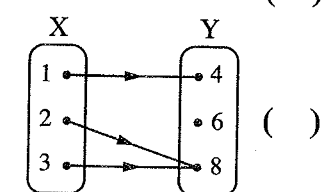
   (a) 4 (b) 3 (c) 2 (d) 1

6. If $X = \{1\}$, then $X^2 =$ ....

   (a) 1 (b) (1 , 1) (c) $\{(1, 1)\}$ (d) $\{1\}$

3 Put (✓) or (✗) :

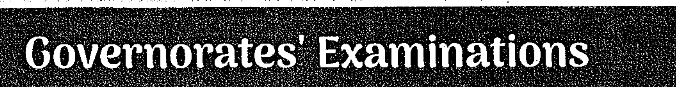
1. If the function $f = \{(1 , 3) , (2 , 4) , (3 , 3)\}$, then the domain of the function is $\{1 , 2 , 3\}$ ( )
2. If $y \propto x$ and $y = 6$ when $x = 3$, then $y = 2$ when $x = 4$ ( )
3. If $\sum (x - \bar{x})^2 = 36$ for a set of values whose number equals 9 , then $\sigma = 4$ ( )
4. The intersection point of the straight line $f(x) = x + 2$ with x-axis is the point $(-2 , 0)$ ( )
5. If $f : X \longrightarrow Y$, then X is called the domain of this function. ( )
6. The arrow diagram from X to Y is a function. ( )



4 Join from column (A) to column (B) :

(A)	(B)
1. If $(1 , 4) \in \{2 , x\} \times \{1 , 4\}$, then $x =$	• 6
2. If the function f where $f(x) = x - 4$ is represented graphically by a straight line passing through the point $(a , 2)$, then $a =$	• 1
3. $\frac{1}{2} = \frac{3}{6} = \frac{4}{8} = \frac{\cdots\cdots}{16}$	• 10
4. If $f(x) = 5$, then $f(5) + f(-5) =$	• ± 6
5. The middle proportional of the two numbers 4 and 9 is	• 2
6. **In the opposite figure :** The equation of the line of symmetry is $x =$	• 8

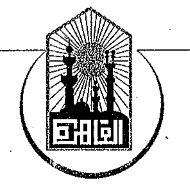





Governorates' Examinations on Algebra and Statistics



1 Cairo Governorate



Answer the following questions : (Calculator is allowed)

1 Choose the correct answer from those given :

1. The simplest dispersion measure is ....

   (a) the arithmetic mean. (b) the median.

   (c) the range. (d) the mode.

2. $2X^2 \times 3X =$ ....

   (a) $6X^3$ (b) $5X^3$ (c) $6X^2$ (d) $5X^2$

3. If $X = \{3\}$, $n(Y) = 5$, then $n(X \times Y) =$ ....

   (a) 1 (b) 5 (c) 8 (d) 15

4. The simplest form of the expression : $3X - 4y + 5X + 7y$ is ....

   (a) $7X + 12y$ (b) $11Xy$ (c) $10X + 9y$ (d) $8X + 3y$

5. The relation which represents an inverse variation between the two variables y and X is ....

   (a) $Xy = 5$ (b) $y = X + 3$ (c) $\frac{X}{5} = \frac{y}{2}$ (d) $y = 2X$

6. If $\sqrt{X} = 4$, then $X =$ .... where $X \in \mathbb{Z}^+$

   (a) 2 (b) 4 (c) 8 (d) 16

2 [a] Graph the curve of the function $f : f(X) = X^2$ where $X \in [-3 , 3]$

, from the graph find :

1. The maximum or the minimum value of the function.
2. The equation of the axis of symmetry.

[b] Find the standard deviation to the set of the values : 15 , 19 , 20 , 21 , 25



3 [a] If $X = \{3 , 4\}$, $Y = \{4 , 5\}$, $Z = \{5 , 6\}$, **find :**

1. $X \times Y$
2. $(X - Y) \times Z$

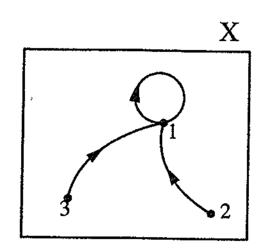
[b] If X , y , z and ℓ are proportional quantities , **prove that :** $\frac{y - X}{X} = \frac{\ell - z}{z}$



4 [a] Find the number which if added to both of terms of the ratio 3 : 5 , then it becomes 1 : 2

[b] **In the opposite figure :**

The arrow diagram represents the relation R on the set X



1 Write R 2 Is R a function ? If it's , find its range.

5 [a] If $y \propto X$ and $y = 20$ as $X = 4$, **find :**

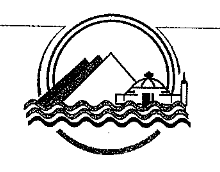
1 The constant of variation between y and X

2 The value of X when $y = 40$

[b] If $f(X) = 2X + k$, $f(5) = 13$, **find the value of :** k



2 Giza Governorate



Answer the following questions :

1 **Choose the correct answer :**

1 Double the number 2^8 is ....

(a) 2^{10} (b) 2^{16} (c) 4^8 (d) 2^9

2 If $X y = 3$, then $y \propto$ ....

(a) X (b) $3X$ (c) $\frac{1}{X}$ (d) $\frac{1}{3}X$

3 If $X^2 + y^2 = 25$, $(X + y)^2 = 49$, then $X y =$ ....

(a) 6 (b) 10 (c) 12 (d) 24

4 If $f(X) = 3$, then $f(3) + f(-3) =$ ....

(a) 0 (b) 1 (c) -6 (d) 6

5 $]-2 , 5[\cup \{-2 , 5\} =$ ....

(a) $[-2 , 5]$ (b) $[-2 , 5[$ (c) $]-2 , 5]$ (d) $]-2 , 5[$

6 The range of the set of the values : 5 , 14 , 4 , 23 , 15 is ....

(a) 12 (b) 14 (c) 19 (d) 23

2 [a] If $X = \{2 , 5\}$, $Y = \{1 , 2\}$, $Z = \{3\}$, **then find :**

1 $n(X \times Z)$ 2 $(Y \cap X) \times Z$

[b] If $f(X) = 4X + b$, $f(2) = 10$, **then find the value of :** b



3 [a] If $X = \{2, 3, 5\}$, $Y = \{4, 6, 8, 10\}$ and R is a relation from X to Y where "a R b" means "$a = \frac{b}{2}$" for each $a \in X$, $b \in Y$, write R and represent it by an arrow diagram. Is R a function ? and why ?

[b] Find the number which if added to the two terms of the ratio 7 : 11 , it will be 2 : 3

4 [a] If $2a = 3b = 3c$, **then find the numerical value of :** $\frac{6a + b + c}{4a + 6b + 6c}$

[b] Calculate the standard deviation for the following values : 55 , 53 , 57 , 56 , 54

5 [a] If $y \propto X$ and $y = 6$ when $X = 3$, **find :**

1 The relation between X , y   2 The value of y when $X = 4$

[b] Represent graphically the curve of the function $f : f(X) = 4 - X^2$ where $X \in [-3, 3]$ and from the graph deduce the vertex of the curve and the equation of the symmetry axis.



3 Alexandria Governorate



Answer the following questions : ***(Calculators are allowed)***

1 Choose the correct answer from those given :

1 If n (X) = 5 , n (X × Y) = 10 , then n (Y) = ...

(a) 4 (b) 3 (c) 2 (d) 1

2 If $X = \frac{1}{\sqrt{3} + \sqrt{2}}$, $y = \sqrt{3} + \sqrt{2}$, then $(X + y)^2 =$ ....

(a) 12 (b) $2\sqrt{3}$ (c) $2\sqrt{2}$ (d) zero

3 The arithmetic mean of the set of values : 8 , 9 , 7 , 6 and 5 equals ....

(a) 25 (b) 7 (c) 35 (d) 5

4 For any set Y , then $\varnothing$ .... Y

(a) $\in$ (b) $\notin$ (c) $\subset$ (d) $\not\subset$

5 The relation representing the direct variation between the two variables X and y is ....

(a) $X y = 5$ (b) $y = X + 3$ (c) $\frac{X}{3} = \frac{4}{y}$ (d) $\frac{X}{5} = \frac{y}{2}$

6 $2^{100} = 2^{99} +$ ....

(a) 2 (b) 1 (c) 2^{99} (d) 99

2 [a] If $f : \mathbb{R} \longrightarrow \mathbb{R}$ where $f(X) = 3X$, mention the degree of f

, then find : $f(-2)$, $f\left(\sqrt{3}\right)$

[b] If $5a = 3b$, **then find the value of :** $\frac{7a + 9b}{4a + 2b}$



3 [a] If $X = \{-1, 1, 2\}$, $Y = \{2, 4, 6, 8\}$ and R is a relation from X to Y where "a R b" means "$b = 2a + 4$" for all $a \in X$, $b \in Y$, write R and represent it by an arrow diagram. Is R a function ? Why ?

[b] If $x^4 y^2 - 14 x^2 y + 49 = 0$, **prove that :** $y \propto \frac{1}{x^2}$

4 [a] If $(x - 2, 3) = (5, y + 1)$, **find the value of each of :** x , y

[b] **The following frequency distribution shows the number of children of some families in a new city :**

Number of children	0	1	2	3	4
Number of families	8	16	50	20	6

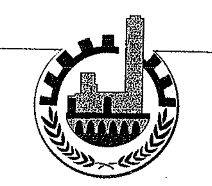
Calculate the mean and standard deviation to the number of children.

5 [a] If a , b , c and d are in continued proportion , **then prove that :** $\frac{a}{b + d} = \frac{c^3}{c^2 d + d^3}$

[b] Represent graphically the function f where $f(x) = x^2 + 2x + 1$, taking $x \in [-4, 2]$ **and from the drawing deduce :**

1. The coordinates of the vertex of the curve.
2. The equation of the symmetry axis.
3. The minimum or the maximum value of the function.

4 El-Kalyoubia Governorate



Answer the following questions :

1 **Choose the correct answer :**

1. $\sqrt[3]{x^6} = \sqrt{\dots\dots}$

   (a) x^3 (b) x^2 (c) x (d) x^4

2. If $(x + 5, 8) = (1, 6y + x)$, then $y = \dots\dots$

   (a) 5 (b) 6 (c) 2 (d) 12

3. The solution set of the equation : $x^2 + 4 = 0$ in $\mathbb{R}$ is $\dots\dots$

   (a) $\{4\}$ (b) $\{-2, 2\}$ (c) $\{-2\}$ (d) $\varnothing$

4. If $xy = 7$, then $y \propto \dots\dots$

   (a) $\frac{1}{x}$ (b) $x - 7$ (c) x (d) $x + 7$

5. If $x^2 - y^2 = 16$ and $x + y = 8$, then $x - y = \dots\dots$

   (a) 2 (b) 1 (c) 128 (d) 64

6. If $\Sigma (x - \bar{x})^2 = 36$ to the set of 9 values , then $\sigma = \dots\dots$

   (a) 2 (b) 4 (c) 18 (d) 27



2 [a] Represent graphically the function f where $f(x) = (x - 2)^2$, $x \in [0, 4]$

From the graph , deduce :

1 The equation of the symmetry axis.

2 The maximum (minimum) value of the function.

[b] If $y \propto \frac{1}{x}$ and $x = 2\frac{4}{5}$ when $y = \frac{4}{7}$, find the value of y when $x = 3\frac{1}{5}$

3 [a] If $X = \{2, 3, 5\}$, $Y = \{4, 6, 8, 10\}$ and R is a relation from X to Y , where "a R b" means "2 a = b" for each $a \in X$, $b \in Y$

1 Write R and represent it by an arrow diagram.

2 Is R a function ?

[b] If a , b , c and d are proportional , **prove that :** $\sqrt[3]{\frac{5a^3 - 3c^3}{5b^3 - 3d^3}} = \frac{a + c}{b + d}$

4 [a] If $X = \{2, 4\}$, $Y = \{4, 0\}$, $Z = \{4, 5, -2\}$, **find :**

1 $(Z - Y) \times (X \cap Y)$ 2 $n(X^2)$

[b] If $f(x) = 4x + b$, $f(3) = 15$, **find the value of :** b

5 [a] If $\frac{a}{2x + y} = \frac{b}{3y - x} = \frac{c}{4x + 5y}$, **prove that :** $\frac{a + 2b}{7} = \frac{4b + c}{17}$

[b] **Find the standard deviation for this distribution :**

X	zero	1	2	3	4	5	Total
K	3	16	17	25	20	19	100

5 El-Sharkia Governorate



Answer the following questions : *(Calculators are allowed)*

1 **Choose the correct answer from those given :**

1 If the arithmetic mean of the quantities $2x$, 3 , 4 , 5 equals 4 , then $x =$ ....

(a) 1 (b) 2 (c) 3 (d) 4

2 If $X \times Y = \{(1, 2), (3, 4)\}$, then $X \cap Y =$ ....

(a) $\{1, 2\}$ (b) $\{(3, 4)\}$ (c) $\varnothing$ (d) $\{1, 4\}$

3 If $y = m x$ where m is a constant $\neq$ zero , which of the following statements is false ?

(a) $y \propto x$ (b) $x \propto y$ (c) $x = \frac{1}{m} y$ (d) $x \propto \frac{1}{y}$



4 If a , b , c , d are proportional quantities , then $\frac{a\,d - b\,c}{a^2 + b^2 + c^2} =$ ....

(a) zero (b) 1 (c) 2 (d) 3

5 $f : f(X) = (2a - 2)X^3 + 3X^2 + X + 2$ is a polynomial function from the second degree when a = ...

(a) zero (b) 2 (c) 3 (d) 1

6 If the point (a – 5 , 5 – a) lies in the fourth quadrant , then ....

(a) $a \geq 5$ (b) $a \leq 5$ (c) $a > 5$ (d) $a < 5$

2 [a] If $X = \{1 , 2 , 3\}$; $Y = \{3 , 4\}$, **find :**

1 $X - Y$ 2 $(Y \cap X) \times Y$ 3 $n(Y^2)$

[b] If a , b , c and d are in continued proportional , **prove that :** $\frac{b + d}{c^2 d + d^3} = \frac{a}{c^3}$

3 [a] If $X = \left\{\frac{1}{2} , 1 , \text{zero} , -\frac{1}{2} , -1\right\}$, $Y = \{1 , 2 , \text{zero} , -1 , -2\}$

and R is a relation from X to Y where " a R b " means "a is the multiplicative inverse of b" for each $a \in X$ and $b \in Y$

Write R and represent it by an arrow diagram. Is R a function ? and why ?

[b] If y varies inversely as X^2 where $y = 9$ at $X = \frac{2}{3}$

, **find :** 1 The relation between y and X

2 The value of y when $X = \frac{1}{2}$

4 [a] Represent graphically the quadratic function f where $f(X) = (X - 3)^2 + 1$ taking $X \in [0 , 6]$ **From the graph deduce :**

1 The coordinates of the vertex of the curve.

2 The minimum value of the function.

3 The equation of the axis of symmetry of the curve.

[b] If $\frac{X}{3} = \frac{y}{2} = \frac{z}{5}$, **find the value of :** $\frac{X y + y z}{X^2 + y^2}$

5 [a] **Calculate the standard deviation for the values :** 12 , 13 , 16 , 18 , 21

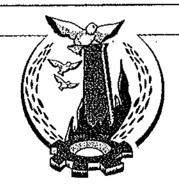
[b] If $f(X) = aX + b$ and $f(a) = b$

Find the value of the expression : $a b^2 + 5$





El-Monofia Governorate



Answer the following questions : (Using calculator is permitted)

1 Choose the correct answer from those given :

1. The number 3 belongs to the solution set of the inequality ....
   (a) $x > 3$ (b) $x < 3$ (c) $-x \geq -3$ (d) $-x \geq 3$

2. $\left(\frac{-3}{4}\right)^{zero}$ .... $\left(\frac{-3}{4}\right)^2$
   (a) $<$ (b) $>$ (c) $=$ (d) $\leq$

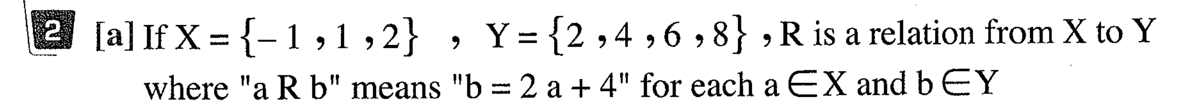
3. The number lying between 0.02 and 0.03 is ....
   (a) 0.00025 (b) 0.0025 (c) 0.025 (d) 0.25

4. If $a < 5$, then the point $(2, a - 5)$ lies in the .... quadrant.
   (a) first (b) second (c) third (d) fourth

5. If $\frac{a}{3} = \frac{b}{5}$, then $5a - 3b + 4 =$ ....
   (a) 3 (b) 4 (c) 5 (d) 6

6. If $\sum (x - \overline{x})^2 = 48$ of a set of values and the number of these values is 12, then $\sigma =$ ....
   (a) 2 (b) -2 (c) -4 (d) 4

2 [a] If $X = \{-1, 1, 2\}$, $Y = \{2, 4, 6, 8\}$, R is a relation from X to Y where "a R b" means "$b = 2a + 4$" for each $a \in X$ and $b \in Y$



1. Write R and represent it by an arrow diagram.
2. Show that R is a function and write its range.

[b] If the straight line which represents the function $f : \mathbb{R} \longrightarrow \mathbb{R}$ where $f(x) = 6x - a$ cuts y-axis at the point $(b, 3)$, **find the value of :** $2a - 5b$

3 [a] If $X = \{1\}$, $Y = \{2, 3\}$, $Z = \{3, 4, 5\}$, **find each of the following :**

1. $X \times Y$ 2. $X \times (Y - Z)$ 3. $n(Z^2)$

[b] If b is the middle proportional between a and c, **prove that :** $\frac{a^2 + b^2}{b^2} = \frac{b^2 + c^2}{c^2}$

4 [a] If $a : b : c = 2 : 3 : 5$ and $a + b + c = 35$, **then find the value of each of :** a, b and c

[b] If $y = a + 7$, $a \propto \frac{1}{x^2}$ and $a = 3$ when $x = 2$, **then find :**

1. The relation between x and y
2. The value of y when $x = \sqrt{3}$



5 **[a]** Draw the curve of the function $f : f(X) = X^2 - 4X$, taking $X \in [-1, 5]$

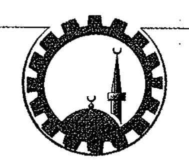
and from the graph find :

1. The coordinates of the vertex of the curve.
2. The equation of the line of symmetry.
3. The maximum or the minimum value of the function.

[b] Find the standard deviation for the following set of values : 20 , 27 , 5 , 16 , 32



El-Gharbia Governorate



Answer the following questions : ***(Calculators are allowed)***

1 **Choose the correct answer :**

1. The following functions are polynomial functions except the function f where $f(X) =$ ....

(a) $X + 3$ (b) $\sqrt{2}\,X + 1$ (c) $X\left(X + \frac{1}{X}\right)$ (d) $X^2 (X + 4)$

2. The solution set of the equation : $(X - 5)^{zero} = 1$ in $\mathbb{R}$ is ....

(a) $\{5\}$ (b) $\{5, -5\}$ (c) $\mathbb{R}$ (d) $\mathbb{R} - \{5\}$

3. If $(a - 7, 26) = (-3, b^3 - 1)$, then $\sqrt{a^2 + b^2} =$ ....

(a) 5 (b) – 5 (c) ± 5 (d) ± 7

4. The second proportional to the numbers 2 , ... , 8 is ....

(a) 4 (b) 6 (c) ± 4 (d) ± 6

5. The range of the set of the values : 7 , 3 , 6 , 9 , 5 is ....

(a) 3 (b) 4 (c) 6 (d) 12

6. If $y \propto X$ and $y = 2$ when $X = 8$, then $y = 3$ when $X =$ ....

(a) 16 (b) 12 (c) 24 (d) 6

2 **[a]** If $X = \{-2, -3, 2\}$, $Y = \left\{\frac{1}{8}, \frac{1}{27}, 8\right\}$ and R is a relation from X to Y where "a R b" means "$a^3 = b$" for all $a \in X$, $b \in Y$, write R , and represent it by an arrow diagram. Is R a function or not with a reason ?

[b] If $X^4 y^2 - 14 X^2 y + 49 = 0$, **then prove that :** $y \propto \frac{1}{X^2}$

3 **[a]** If a , b , c and d are proportional quantities, **then prove that :** $\frac{a + b}{b} = \frac{c + d}{d}$

[b] Represent graphically the curve of the function $f : f(X) = 2 - X^2$, taking $X \in [-3, 3]$ and from the graph deduce the equation of the axis of symmetry, the maximum value or the minimum value of the function.



4 [a] If $X \times Y = \{(1, 1), (1, 3), (1, 5)\}$, find Y^2 and represent it by a Cartesian diagram.

[b] Find the positive number which if we add its square to each of the two terms of the ratio 5 : 11, it becomes 3 : 5

5 [a] If the straight line representing the function $f : \mathbb{R} \longrightarrow \mathbb{R}$ where $f(x) = 6x - \ell$ cuts the y-axis at the point (m, 3), **find the value of each of :** ℓ and m

[b] Calculate the arithmetic mean and the standard deviation for the following data :

23, 12, 17, 13, 15 rounding the result of the standard deviation to one decimal place.



8 El-Dakahlia Governorate

Answer the following questions : *(Calculator is permitted)*

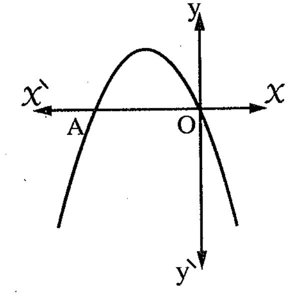


1 [a] **Choose the correct answer from those given :**

1 If $5x = 9y$, then $\frac{3x}{2y} = \dots\dots$

(a) 27 : 10 (b) 9 : 5 (c) 5 : 9 (d) 81 : 25

2 **In the opposite figure :**



The curve of a quadratic function, A (– 4, 0), then the equation of the axis of symmetry is $x = \dots\dots$

(a) 1 (b) – 1

(c) – 2 (d) 0

3 The number added to each of the numbers 1, 3, 6 to be proportional is ....

(a) 4 (b) 3 (c) 1 (d) 2

[b] If b is the middle proportional between a and c, **prove that :** $\frac{a^2}{b^2} + \frac{b^2}{c^2} = \frac{2a}{c}$

2 [a] **Choose the correct answer from those given :**

1 If $f(x + 3) = x - 3$, then $f(7) = \dots\dots$

(a) 4 (b) 1 (c) 7 (d) 10

2 If $\Sigma (x - \bar{x})^2 = 36$ for 9 values, then the standard deviation = ...

(a) 2 (b) 18 (c) 27 (d) 4

3 If $f(x) = 3$, then $f(2) - f(7) = \dots\dots$

(a) 5 (b) – 5 (c) 0 (d) – 4

[b] If $X = \{4, 5, 7\}$, R is a function on X and $R = \{(a, 5), (b, 5), (4, 7)\}$, **find :**

1 The value of 3 a + 3 b

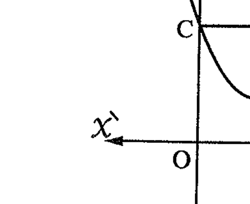
2 The range of the function.

3 [a] If $\frac{a}{4X+y}=\frac{b}{X-4y}$, **prove that :** $\frac{a+b}{5X-3y}=\frac{a-b}{3X+5y}$

[b] **Calculate the standard deviation of values :** 12 , 13 , 16 , 18 , 21

4 [a] The opposite figure represents the curve of the function f where $f(X)=X^2-(k-2)X-k+4$, the figure OABC is a square.

Find the value of : k



[b] If $y=1+b$, b varies inversely with the square of X , $X=1$ at $y=5$, find the relation between X and y , then find the value of y at $X=2$

5 [a] If $f(X)=a+X^2$, $\ell(X)=c$ are two polynomial functions where $3f(2)+3\ell(X)=6$, **find the numerical value of :** $2f(0)+2\ell(7)$ where a and c are constants.

[b] If $X=\{3,5,7\}$, $Y=\{X : X\in\mathbb{N} , 10<X<30\}$ and the function f from $X\longrightarrow Y$ is $f=\{(3,9),(5,15),(7,21)\}$

1. Find the domain of f
2. Write the rule of the function.

9 Ismailia Governorate



Answer the following questions : (Calculators are allowed)

1 **Choose the correct answer from those given :**

1. The expectation of the match of Ismaili club in mathematics is called ....
   (a) probability. (b) equations. (c) inequalities. (d) relations.
2. The third proportional of the quantities 2 , 3 and 6 is ....
   (a) 1 (b) 4 (c) 9 (d) 12
3. The number $\frac{2X}{X-5}$ is a rational number if $X\neq$ ....
   (a) zero (b) $\frac{1}{5}$ (c) $\frac{2}{5}$ (d) 5
4. If the point $(b-4 , 2-b)$ lies in the third quadrant, then b = ...
   (a) 2 (b) 3 (c) 4 (d) 6
5. If $17X+8=11$, then $17X+11=$ ....
   (a) 8 (b) 11 (c) 14 (d) 17
6. If a set of values are equal , then the dispersion of these values is ....
   (a) > zero (b) < zero (c) = 1 (d) = zero



2 **[a]** If $X = \{2, 3\}$, $Y = \{3, 4, 5\}$, **find :**

1 $X \times Y$ 2 X^2 3 $n(Y^2)$

[b] If $3a = 4b$, **find the value of :** $\frac{2a + b}{5a - 3b}$

---

3 **[a]** If y varies inversely with the square of X and $y = 5$ when $X = 3$, find the value of y when $X = 2$

[b] If the straight line which represents the function $f : \mathbb{R} \longrightarrow \mathbb{R}$ where $f(X) = 3X - a$ cuts the y-axis at the point $(b, 5)$

, **find the values of :** a and b

---

4 **[a]** If we add double the number X to each of the numbers 1 , 3 and 7 , it becomes proportional quantities. **Find the value of :** X

[b] If $X = \{-1, 1, 2\}$, $Y = \{2, 4, 6, 8\}$ and R is a relation from X to Y where "a R b" means "b = 2 a + 4" for all $a \in X$, $b \in Y$

1 Find the relation R and represent it by an arrow diagram.

2 Is R a function ? and why ?

---

5 **[a]** Represent graphically the curve of the function $f : f(X) = 2 - X^2$ where $X \in [-3, 3]$, **then from the graph find :**

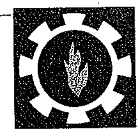
1 The coordinates of the vertex of the curve.

2 The equation of the axis of symmetry.

3 The maximum or minimum value of the function.

[b] Calculate the standard deviation of the values : 12 , 13 , 16 , 18 , and 21

10 Suez Governorate



Answer the following questions : ***(Calculators are allowed)***

1 **Choose the correct answer from those given :**

1 If 2 , 3 , 6 and X are proportional , then $X =$ ....

(a) 9 (b) 18 (c) 12 (d) 3

2 If $3ak = 12a^2$, then $k =$ ....

(a) $4a^2$ (b) $3a$ (c) $4a$ (d) $3a^2$

3 If $X = \{1, 2\}$, $Y = \{3, 4\}$, then $(3, 4) \in$ ....

(a) $X \times Y$ (b) $Y \times X$ (c) X^2 (d) Y^2



4 If (a , 5) = (6 , b) , then a + b = ...

(a) 5 (b) 11 (c) 6 (d) 1

5 $\frac{\text{Sum of the values}}{\text{Their number}}$ = ...

(a) the range. (b) the standard deviation.

(c) the arithmetic mean. (d) the mode.

6 If the point (2 , y) lies on the X-axis , then y + 4 = ...

(a) 5 (b) 4 (c) 2 (d) 3

---

2 [a] If 4 a = 3 b , **then find the value of :** $\frac{4a+b}{2a-b}$

[b] If X = {0 , 3 , 4} , Y = {1 , 2 , 3 , 4 , 5} and R is a relation from X to Y where "a R b" means "a + b = 5" for all a ∈ X , b ∈ Y

1 Find the relation R

2 Represent the relation R by an arrow diagram.

3 Is R a function ?

---

3 [a] If X × Y = {(2 , 6) , (2 , 9) , (3 , 6) , (3 , 9)} , **find :**

1 X , Y 2 Y × Y

[b] Draw the curve of the function f : $f(X) = 1 + X^2$ at the interval [– 3 , 3]

and from the graph find :

1 The coordinates of the vertex of the curve.

2 The equation of the axis of symmetry.

3 The minimum value.

---

4 [a] If X , y , z , r are proportional quantities , **then prove that :** $\frac{X^2 + 2z^2}{y^2 + 2r^2} = \frac{Xz}{yr}$

[b] **From the data of the following table , answer the following questions :**

1 Show the kind of variation between y and X

2 Find the constant proportion.

3 Find the value of y when $X = 3$

X	2	4	6
y	6	3	2

---

5 [a] If $f(X) = X^2 - 3X$, $g(X) = X - 3$

1 **Find :** $f(2) + g(2)$ 2 **Prove that :** $f(3) + g(3) = 0$

[b] **Calculate the standard deviation for the values :** 12 , 13 , 16 , 18 , 21





11 Port Said Governorate



Answer the following questions :

1 Choose the correct answer from those given :

1 If $(3 , 5) \in \{3 , 6\} \times \{X , 8\}$, then $X =$ ....

(a) 8 (b) 6 (c) 5 (d) 3

2 The linear function given by the rule $y = 2X - 1$ is represented graphically by a straight line intersecting the y-axis at the point ....

(a) $\left(\frac{1}{2} , 0\right)$ (b) $(0 , -1)$ (c) $(-1 , 0)$ (d) $\left(0 , \frac{1}{2}\right)$

3 The difference between the greatest value and the smallest value in a set of individuals is called ....

(a) the standard deviation. (b) the arithmetic mean.

(c) the median. (d) the range.

4 If the point $(X - 4 , 2 - X)$ where $X \in \mathbb{Z}$ is located in the fourth quadrant , then $X =$ ....

(a) 2 (b) 3 (c) 4 (d) 6

5 Which of the following tables represents the direct variation between X and y ?

(a)

X	y
2	9
4	18

(b)

X	y
3	20
5	12

(c)

X	y
3	6
-2	-9

(d)

X	y
10	9
5	18

6 If $(X - 1 , 11) = (8 , y + 3)$, then $\sqrt{X + 2y} =$ ....

(a) 5 (b) ± 5 (c) $\sqrt{17}$ (d) 25

2 [a] If $X = \{1 , 2\}$, $Y = \{2 , 5\}$, $Z = \{4 , 5\}$, **then find :**

1 $n(X \times Z)$ 2 $(X - Y) \cap Z$

[b] Represent graphically $f : f(X) = X^2 + 2X + 1$, consider $X \in [-4 , 2]$

From the graph deduce :

1 The coordinates of the vertex of the curve.

2 The minimum or the maximum value of the function.

3 [a] If $f(X) = 4X + b$ and $f(3) = 15$, **find the value of :** b

[b] If $y \propto \frac{1}{X}$ and $y = 6$ when $X = 2.5$, **find :**

1 The relation between X , y 2 The value of y when $X = 5$



4 [a] If $X = \{1, 2, 3\}$, $Y = \{12, 21, 47, 52\}$ and R is a relation from X to Y where "a R b" means "a is a digit from the digits of b" for each $a \in X$, $b \in Y$

[1] Write R and represent it by an arrow diagram.

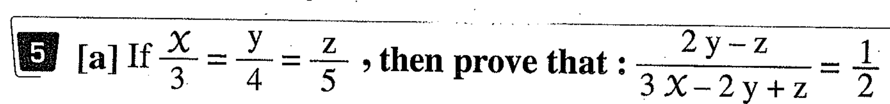
[2] Which of the following relations is correct and why ? 1 R 52 , 2 R 21 , 3 R 47

[b] If 7 , x and $\frac{1}{y}$ are in continued proportion , **then find the value of :** $x^4 y^2$

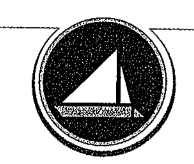
5 [a] If $\frac{x}{3} = \frac{y}{4} = \frac{z}{5}$, **then prove that :** $\frac{2y - z}{3x - 2y + z} = \frac{1}{2}$

[b] Calculate the arithmetic mean and the standard deviation for the values :

3 , 6 , 7 , 9 , 15



12 Damietta Governorate



Answer the following questions : ***(Calculators are allowed)***

1 **Choose the correct answer from the given ones :**

[1] $\sqrt{36} =$ ....

(a) 6 (b) – 6 (c) ± 6 (d) 18

[2] The point (– 2 , 5) lies in the .... quadrant.

(a) first (b) second (c) third (d) fourth

[3] The commonest measure of dispersions and the most accurate is ....

(a) the median. (b) the arithmetic mean.

(c) the mode. (d) the standard deviation.

[4] $\mathbb{R} =$ ....

(a) $\mathbb{Q} \cap \mathbb{Q}'$ (b) $\mathbb{R}_+ \cap \mathbb{R}_-$ (c) $\mathbb{R}_+ \cup \mathbb{R}_-$ (d) $\mathbb{Q} \cup \mathbb{Q}'$

[5] If $(x - 3 , 2^y) = (2 , 32)$, then $(x , y) =$ ....

(a) (5 , 2) (b) (2 , 5) (c) (5 , 5) (d) (2 , 2)

[6] If $x y = 8$, then $y \propto$ ....

(a) $x - 8$ (b) $\frac{1}{x}$ (c) x (d) $x + 8$

2 [a] If $X = \{2, 5\}$, $Y = \{1, 2\}$, $Z = \{3\}$, **find :**

[1] $n(X \times Y)$ [2] $(X - Y) \times Z$ [3] Y^2

[b] If b is the middle proportional between a and c , **prove that :** $\frac{a - b}{a - c} = \frac{b}{b + c}$



3 [a] If $X = \{1, 3, 4, 5\}$, $Y = \{1, 2, 3, 4, 5, 6\}$ and R is a relation from X to Y where "a R b" means "a + b = 7" for all $a \in X$, $b \in Y$

1. Write R
2. Show giving reasons that R is a function and find its range.

[b] If $\frac{21x - y}{7x - z} = \frac{y}{z}$ **, then prove that :** $y \propto z$

4 **[a] Calculate the standard deviation for the values :** 12 , 13 , 16 , 18 , 21

[b] If $y \propto x$, $y = 6$ when $x = 3$ **, find :**

1. The relation between x , y
2. The value of y when $x = 5$

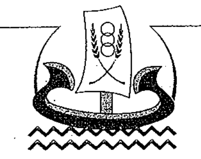
5 [a] If $\frac{x}{3} = \frac{y}{4} = \frac{z}{5}$ **, then prove that :** $\sqrt{3x^2 + 3y^2 + z^2} = 2x + y$

[b] Represent graphically the function $f : f(x) = x^2 + 3$, $x \in [-2, 2]$

From the graph deduce :

1. The equation of symmetry line.
2. The minimum value of the function.

13 Kafr El-Sheikh Governorate



Answer the following questions : (Calculator is allowed)

1 **[a] Choose the correct answer from the given ones :**

1. The third proportional of the numbers 4 , 12 , ... , 48 is ....
   (a) 7 (b) 32 (c) 16 (d) 36
2. $\varnothing$ .... $\{1, 2\}$
   (a) $\in$ (b) $\notin$ (c) $\not\subset$ (d) $\subset$
3. The range of the set of the values : 7 , 3 , 6 , 9 and 5 equals ....
   (a) 3 (b) 6 (c) 4 (d) 12

[b] Represent graphically the function $f : f(x) = (x - 2)^2$, where $x \in [-1, 5]$, then from the graph deduce the vertex of the curve , the equation of the symmetry axis and the minimum value of the function.

2 **[a] Choose the correct answer from the given ones :**

1. $(\sqrt{7} + \sqrt{5})(\sqrt{7} - \sqrt{5}) =$ ....
   (a) 2 (b) 12 (c) 35 (d) -2



2 $|-5|+|5| =$ ....

(a) zero (b) 25 (c) 10 (d) -10

3 If $(X-2, 3) = (5, X+y)$, then $X-y =$ ....

(a) 7 (b) 3 (c) -11 (d) 11

[b] If y is the middle proportional between X and z, **prove that :** $\frac{X-y}{X-z} = \frac{y}{y+z}$

3 **[a]** If $X = \{1, 3, 4, 5\}$, $Y = \{1, 2, 3, 4, 5\}$ and R is a relation from X to Y where "a R b" means "b = 6 – a" for all $a \in X$, $b \in Y$

1 Write R and represent it by an arrow diagram.

2 Show that R is a function and find its range.

[b] If $3X = 2y$, **find the value of the ratio :** $\frac{3X+2y}{6y-X}$

4 **[a]** If $X = \{2, -1\}$, $Y = \{4, 0\}$, $Z = \{4, 5, -2\}$, **find :**

1 $X \times Y$ 2 $(Y \cap Z) \times X$ 3 $n(Y^2)$

[b] If $f(X) = 2X + a$ and $f(2) = 1$, **find the value of :** a

5 **[a]** If y changes inversely with X^2 and $y = 2$ when $X = 4$

1 Find the relation between y and X

2 Deduce the value of y when $X = 16$

[b] Calculate the arithmetic mean and the standard deviation of the set of values : 8, 9, 7, 6 and 5

14 El-Beheira Governorate



Answer the following questions : ***(Calculator is permitted)***

1 **Choose the correct answer from the given ones :**

1 The solution set in $\mathbb{R}$ for the equation $X^2 + 9 = 0$ is ....

(a) $\{-3\}$ (b) $\{3\}$ (c) $\{-3, 3\}$ (d) $\varnothing$

2 If the point $(k-4, 2-k)$ where $k \in \mathbb{Z}$ is located in the third quadrant, then k = ...

(a) 2 (b) 3 (c) 4 (d) 6

3 The multiplicative inverse of the number $\frac{\sqrt{3}}{6}$ is ....

(a) $-\frac{\sqrt{3}}{6}$ (b) $6\sqrt{3}$ (c) $2\sqrt{3}$ (d) $-2\sqrt{3}$



4 If 7 , X , $\frac{1}{y}$ are in continued proportion , then X^2 y = ...

(a) 7 (b) $\frac{1}{7}$ (c) 14 (d) 49

5 If a + 3 b = 7 , c = 3 , then the value of a + 3 (b + c) = ...

(a) 10 (b) 16 (c) 21 (d) 30

6 The difference between the greatest value and the smallest value in a set of values is called ....

(a) the arithmetic mean. (b) the median.

(c) the range. (d) the standard deviation.

---

2 [a] If X = {1} , Y = {2 , 3} , Z = {2 , 5 , 6} , **find :**

1 X × (Y ∩ Z) 2 n (Z^2)

[b] Find the positive number which if its square is added to each of the two terms of the ratio 5 : 11 , it becomes 3 : 5

---

3 [a] If the point (a , 3) is located on the straight line which represents the function $f : \mathbb{R} \longrightarrow \mathbb{R}$ where $f(X) = 4X - 5$, **find the value of :** a

[b] If $\frac{a+b}{3} = \frac{b+c}{6} = \frac{c+a}{5}$, **then prove that :** $\frac{a+b+c}{a} = 7$

---

4 [a] If X = {1 , 3 , 5} and R is a relation on X where "a R b" means "a + b = 6" for each a ∈ X , b ∈ X

1 Write R

2 Show that R is a function and find its range.

[b] **Calculate the standard deviation for the values :** 17 , 22 , 20 , 23 , 18

---

5 [a] If y ∝ X , y = 6 when X = 3 , **find :**

1 The relation between y , X

2 The value of y when X = 5

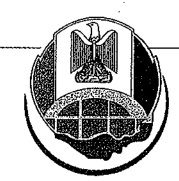
[b] Represent graphically the quadratic function f where $f(X) = X^2 - 3$, where $X \in [-3 , 3]$ **and from the graph deduce :**

1 The equation of the axis of symmetry.

2 The minimum value of the function.



15 El-Fayoum Governorate



Answer the following questions : (Using calculators is allowed)

1 Choose the correct answer :

1 The positive square root to the average of squares deviations of values from the mean is called the ....

(a) median. (b) mode. (c) range. (d) standard deviation.

2 If $f(3X) = 6$, then $f(-2) =$ ....

(a) -12 (b) -3 (c) 6 (d) -18

3 $[-5, 3] -]-5, 3[=$ ....

(a) $\{-5, 3\}$ (b) $]-5, 3]$ (c) $[-5, 3[$ (d) $\varnothing$

4 The fifth of the number 5^{10} equals ....

(a) 5^2 (b) 5^9 (c) 5^5 (d) 5^8

5 If $\frac{X}{2} = \frac{y}{3} = \frac{z}{5}$, then each ratio equals ....

(a) $\frac{X + y + z}{30}$ (b) $\frac{X + 2y - z}{3}$ (c) $\frac{X - y + z}{10}$ (d) $\frac{X - y}{5}$

6 If X is an odd number , then the odd number of the following is ....

(a) $X - 1$ (b) $X + 1$ (c) $X + 2$ (d) $X + 3$

2 [a] If $3a = 2b$, **then find the value of the ratio :** $\frac{3a - b}{a + 2b}$

[b] If $f(X) = aX + 5$ and $f(-3) = 8$, **then find the value of :** a

3 [a] If X , y , z are in continued proportion , **prove that :** $\frac{X^2 + y^2}{y^2 + z^2} = \frac{X}{z}$

[b] If $X = \{-1, 1, 2\}$, $Y = \{2, 4, 6, 8\}$ and R is a relation from X to Y where "a R b" means "$b = 2a + 4$" for each $a \in X$, $b \in Y$, write R and represent it by an arrow diagram , show that R is a function from X to Y , why ?

4 [a] If $y \propto X$ and $y = 20$ when $X = 7$, then find the relation between X and y , then find the value of y when $X = 14$

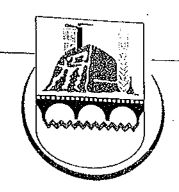
[b] If $(5 - 2X, y^3) = (1, 27)$, **then find the value of :** $\sqrt{3X + y}$

5 [a] Represent graphically the function $f : f(X) = X^2 - 2$ where $X \in [-3, 3]$, and from the drawing deduce the coordinates of the vertex of the curve and the minimum value of the function.

[b] **Find the standard deviation of the values :** 7 , 16 , 13 , 5 , 9



16 Beni Suef Governorate



Answer the following questions : (Calculator is allowed)

1 Choose the correct answer from those given :

1. The point (– 4 , – 2) lies in the .... quadrant.
   (a) first (b) second (c) third (d) fourth
2. If x represents a negative number , then the positive number from the following is ....
   (a) $2x$ (b) $3x^2$ (c) $4x^3$ (d) $6x^5$
3. If $xy = 1$, then y varies with ....
   (a) $\frac{1}{x}$ (b) $x - 1$ (c) x (d) $x + 1$
4. The simplest and easiest method of measuring dispersion is ....
   (a) the median. (b) the mean.
   (c) the standard deviation. (d) the range.
5. If $\frac{a}{b} = \frac{c}{d} = \frac{e}{f} = k$ where $k \in \mathbb{R}$, then $\frac{a\,c\,e}{b\,d\,f} =$ ....
   (a) k^3 (b) k^2 (c) k (d) 3
6. If $3x = 2y$, then $\frac{2x}{3y} =$ ....
   (a) $\frac{1}{2}$ (b) $\frac{2}{3}$ (c) $\frac{9}{4}$ (d) $\frac{4}{9}$

2

[a] Find the number that if we add it to each term of the ratio 7 : 11 , it becomes 2 : 3

[b] If $X = \{1 , 2 , 3\}$, $Y = \{1 , 3 , 4 , 9\}$ and R is a relation from X to Y where "a R b" means "$b = a^2$" for all $a \in X$, $b \in Y$, write R and represent it by an arrow diagram and show whether R is a function or not.

3

[a] If $\frac{x}{2} = \frac{y}{3} = \frac{z}{4} = \frac{3x - 2y + 5z}{5k}$, **find the numerical value of :** k

[b] Represent graphically the function $f : f(x) = 2 - x^2$, $x \in [-2 , 2]$, from the graph deduce the vertex point of the curve and the maximum value of the function.

4

[a] If y varies directly with x and y = 3 when $x = 15$, find the relation between y and x , then find the value of x when y = 100

[b] If $X = \{1 , 2\}$, $Y = \{3 , 4 , 5\}$, **find :**

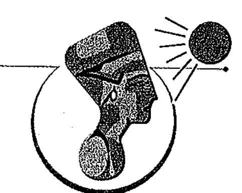
1. $X \times Y$ 2. $Y \times X$ 3. X^2



5 [a] If $f(X) = 3X + k$, $g(X) = k$ where f and g are polynomial functions , **find the value of k if :** $f(3) + g(5) = 15$

[b] **Calculate the standard deviation of the set of values :** 12 , 13 , 16 , 18 , 21

17 El-Menia Governorate



Answer the following questions : *(Calculators are allowed)*

1 **Choose the correct answer from those given :**

1 $\sqrt{5} + \sqrt{20} = \dots\dots$

(a) $\sqrt{25}$ (b) $5\sqrt{5}$ (c) $9\sqrt{5}$ (d) $3\sqrt{5}$

2 If three times a number = 45 , then $\frac{1}{5}$ this number = ...

(a) 15 (b) 5 (c) 3 (d) 9

3 $5^2 \times 5^{-2} = \dots\dots$

(a) 5 (b) 1 (c) zero (d) – 5

4 If n (X) = 3 , n (X × Y) = 12 , then n (Y) = ...

(a) 4 (b) 9 (c) 15 (d) 36

5 The relation which represents direct variation between the two variables X and y is ....

(a) $Xy = 5$ (b) $y = X + 3$ (c) $\frac{X}{3} = \frac{5}{y}$ (d) $\frac{X}{5} = \frac{y}{3}$

6 The range is the .... measure of dispersions.

(a) simplest (b) greatest (c) difficult (d) otherwise

2 [a] If $X = \{1, 2, 3\}$, $Y = \{1, \frac{1}{2}, \frac{1}{3}, \frac{1}{5}\}$ and R is a relation from X to Y where "a R b" means "a is the multiplicative inverse of b" for all $a \in X$, $b \in Y$, write R and represent it by an arrow diagram. Is R a function ? Why ?

[b] If b is the middle proportional between a and c , **prove that :** $\frac{a+b}{a-c} = \frac{b}{b-c}$

3 [a] If $2y = 3X$, **find the value of :** $\frac{3X + 2y}{6y - X}$

[b] If $X = \{3, 4\}$, $Y = \{4, 5\}$, $Z = \{6, 5\}$, **find :**

1 $X \times (Y \cap Z)$ 2 $(X - Y) \times Z$

4 [a] If $y \propto \frac{1}{X}$ and y = 3 when $X = 2$, **find :**

1 The relation between X and y 2 The value of X when y = 4

[b] **Calculate the standard deviation for the values :** 12 , 13 , 16 , 18 , 21



5 [a] Mention the degree of the function $f : f(X) = 3 - 2X^3$ **, then find :** $f(0)$ and $f(-2)$

[b] Represent graphically the function $f : f(X) = X^2 + 2X + 1$, consider $X \in [-4 , 2]$
and from the drawing deduce :

1. The equation of the symmetry axis.
2. The maximum or the minimum value of the function.

18 Assiut Governorate



Answer the following questions : ***(Calculator is allowed)***

1 **Choose the correct answer :**

1. $X^5 \div X^2 =$ .... (where $X \neq 0$)
   (a) X^7 (b) X^3 (c) X^{10} (d) X^5
2. If $X = \{1\}$, $Y = \{3\}$, then $n(X \times Y) =$ ....
   (a) $\{(1 , 3)\}$ (b) $\{(3 , 1)\}$ (c) 3 (d) 1
3. The multiplicative inverse of the number 0.25 is ....
   (a) 4 (b) – 0.25 (c) $\frac{1}{4}$ (d) – 0.5
4. The middle proportional between 4 , 16 is ....
   (a) – 8 (b) 8 (c) ± 8 (d) 64
5. 0.12 + 0.3 = ...
   (a) 0.42 (b) 0.15 (c) 0.24 (d) 0.36
6. The range of the set of the values : 4 , 14 , 25 and 34 equals ....
   (a) 4 (b) 30 (c) 38 (d) 34

2 [a] If $X = \{6 , 7\}$, $Y = \{3 , 7\}$ **, find :**

1. $(X \cap Y) \times X$
2. $n(Y^2)$

[b] If $\frac{a}{2} = \frac{b}{3} = \frac{c}{4}$ **, then prove that :** $\frac{3c - b}{a + b} = \frac{9}{5}$

3 [a] If $X = \{-1 , 2 , 3\}$, $Y = \{1 , 4 , 6 , 9\}$ and R is a relation from X to Y where "a R b" means "$a^2 = b$" for each $a \in X$, $b \in Y$, write R and represent it by an arrow diagram and show that R is a function from X to Y and find its range.

[b] If $y \propto \frac{1}{X}$ and y = 3 when $X = 4$

1. Find the relation between y and X
2. Find the value of y when $X = \frac{3}{4}$

4 [a] Find the positive number which if its square is added to each of the two terms of the ratio 7 : 11 , it becomes 2 : 3

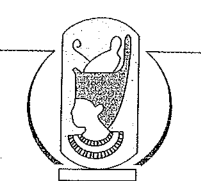


[b] Represent graphically the function $f : f(X) = X^2 - 4$, $X \in [-3 , 3]$, from the graph deduce the vertex of the curve, the maximum value or the minimum value of the function and the equation of the axis of symmetry.

5 **[a]** If $f(X) = X^2 - 2$, $g(X) = 3$, **find :** $f\left(\sqrt{2}\right) + g(5)$

[b] Calculate the arithmetic mean and the standard deviation of the set of the values : 11 , 12 , 15 , 17 , 20





Answer the following questions : ***(Calculators are allowed)***

1 **Choose the correct answer :**

1. $2^8 + 2^8 + 2^8 + 2^8 = \dots\dots$

(a) 2^{32} (b) 8^8 (c) 2^{10} (d) 4^{12}

2. If n (X) = 2 , $n(Y^2) = 9$, then n (X × Y) = ...

(a) 6 (b) 18 (c) 11 (d) 7

3. If $\sqrt{3}\,X - 1 = 2$ $(X \in \mathbb{R})$, then $X = \dots\dots$

(a) 3 (b) $3\sqrt{3}$ (c) -3 (d) $\sqrt{3}$

4. If 8 , 6 , X , 12 are proportional quantities , then $X = \dots\dots$

(a) 4 (b) 16 (c) 5 (d) 25

5. If the median of the values : a + 3 , a + 2 , a + 4 $(a \in \mathbb{Z}^+)$ is 8 , then a = ...

(a) 2 (b) 5 (c) 3 (d) 4

6. .... is a measure for dispersion.

(a) The median (b) The mode (c) The range (d) The mean

2 **[a]** If $X \times Y = \{(1 , 1) , (1 , 3) , (1 , 5)\}$

, find : 1. X , Y 2. Y × X

[b] If $\frac{X}{y} = \frac{2}{3}$ **, then find the value of :** $\frac{3X + 2y}{6y - X}$

3 **[a]** If $X = \{0 , 1 , 2 , 3\}$, $Y = \{2 , 3 , 4 , 5 , 6\}$, R is a relation from X to Y where "a R b" means "a + b = 5" for each $a \in X$, $b \in Y$

1. Write R and represent it by an arrow diagram.

2. Show that R is a function from X to Y and find its range.

[b] Find the number that if we add it to the two terms of the ratio 7 : 11 , the result will be 2 : 3



4 [a] If the straight line $y = 4x - 5$ passes through the point (a , 3) **, find the value of :** a

[b] If $y \propto x$ and $y = 6$ when $x = 3$ **, find :**

1 The relation between x and y

2 The value of y when $x = 5$

5 [a] Represent graphically the function $f : f(x) = x^2 - 4x + 4$, $x \in [-1 , 5]$

, from the graph deduce :

1 The vertex of the curve.

2 The equation of the axis of symmetry.

[b] Calculate the mean and the standard deviation of the values : 12 , 13 , 16 , 18 , 21

20 Qena Governorate

Answer the following questions : (Calculators are permitted)

1 Choose the correct answer :

1 If $x y = 5$, then $y \propto$ ....

(a) x^{-1} (b) x (c) $5x$ (d) x^2

2 $\sqrt{3} + \sqrt{3} + \sqrt{3} =$ ....

(a) 3 (b) 9 (c) $3\sqrt{3}$ (d) 27

3 The middle proportional between 3 , 12 is ....

(a) 6 (b) – 6 (c) ± 6 (d) 9

4 The point (– 2 , 3) lies in the .... quadrant.

(a) first (b) second (c) third (d) fourth

5 All of the following are polynomial functions except ....

(a) $f_1(x) = x^3 + x^2 + 3$ (b) $f_2(x) = x^3 + \frac{1}{x} + 7$

(c) $f_3(x) = 5 - x^2$ (d) $f_4(x) = x^2 (x - 3)^2$

6 The range of the values : 51 , 24 , 43 , 55 , 28 is ....

(a) 55 (b) 24 (c) 21 (d) 31

2 [a] If $X = \{1 , 3 , 4 , 5\}$, $Y = \{1 , 2 , 3 , 4 , 5 , 6 , 7\}$ and R is a relation from X to Y where "a R b" means "a + b = 7" , write R and represent it by an arrow diagram. Is R a function ? Why ? and if it's a function , find its range.

[b] If b is the middle proportional between a and c **, prove that :** $\frac{a^2 + b^2}{b^2 + c^2} = \frac{a}{c}$

3 [a] If $f(x) = x^2 - 3x$, $g(x) = x - 3$

1 **Find :** $f\left(\sqrt{2}\right) + 3\, g\left(\sqrt{2}\right)$

2 **Prove that :** $f(3) = g(3)$

[b] Find the number which if added to each of the two terms of the ratio 7 : 11 , it becomes 2 : 3

4 [a] If 5 a = 3 b , **find :** $\frac{7a+9b}{4a+2b}$

[b] **The following table shows the frequency distribution for the ages of 10 students :**

Ages in years	5	8	9	10	12	**Total**
Number of students	1	2	3	3	1	**10**

Calculate the standard deviation to age in years.

5 [a] If $y \propto X$ and $y = 40$ when $X = 14$, find X when $y = 80$

[b] Represent graphically $f : f(X) = 2X^2 - 3$, $X \in [-2, 2]$ **From the graph find :**

1. The vertex of the curve.
2. The equation of the axis of symmetry.
3. The maximum or minimum value of the function.

21 Luxor Governorate



Answer the following questions :

1 **Choose the correct answer :**

1. The sum of the factors of the number 15 equals ....
   (a) 3 (b) 4 (c) 15 (d) 24
2. If $f(X) = 4X + a$ and $f(2) = 15$, then a = ...
   (a) 2 (b) 4 (c) 7 (d) 15
3. The smallest expression in value when $X = 7$ is ....
   (a) $\frac{6}{X}$ (b) $\frac{6}{X+1}$ (c) $\frac{6}{X-1}$ (d) $\frac{X}{6}$
4. The third proportional of the two numbers – 6 , 12 is ....
   (a) – 24 (b) 6 (c) 18 (d) 72
5. If $3X - 1 = 1 - 3X$, then X = ...
   (a) zero (b) $\frac{1}{3}$ (c) – 1 (d) 3
6. Which of the following values for the number X makes the range of the values X , 15 , 20 , 24 equal 14 ?
   (a) 30 (b) 25 (c) 19 (d) 10

2 [a] If $f = \{(1, 3), (2, 5), (3, 7), (4, 9), (5, 11)\}$, **write :**

1. The domain of f
2. The range of f
3. The rule of f

[b] Two integers , the ratio between them is 2 : 3 , if 7 is subtracted from each of them, the ratio becomes 1 : 2 Find the two numbers.



3 **[a]** If $X = \{-2, 2, 5\}$, $Y = \{3, 7, \ell\}$ and R is a function from X to Y where "a R b" means "$b = a^2 - 1$" for each $a \in X$, $b \in Y$

[1] Find the value of ℓ [2] Write R

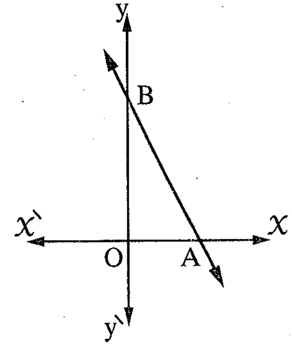
[3] Represent the function by an arrow diagram.

[b] If $y = a - 9$, $y \propto \frac{1}{x^2}$ and $a = 18$ when $x = \frac{2}{3}$

, find the relation between x, y and find the value of y when $x = 1$

4 **[a]** The opposite figure represents the function f where $f(x) = 4 - 2x$

Find the coordinates of A, B and the area of Δ AOB



[b] If $\frac{x}{7} = \frac{y}{3}$, **prove that :** $(2x - 3y)$, $(x + 2y)$, 10, 26 are proportional.

5 **[a] Calculate the standard deviation of the values :** 72, 53, 61, 70, 59

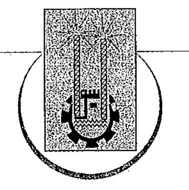
[b] Graph the function $f : f(x) = 1 - 4x + x^2$ where $x \in [0, 4]$ **and from the graph find :**

[1] The vertex of the curve.

[2] The equation of the axis of symmetry.

[3] The maximum or the minimum value of the function.

22 Aswan Governorate



Answer the following questions : (Calculator is allowed)

1 **Choose the correct answer :**

[1] If $X = \{1, 2\}$, $Y = \{0\}$, then $n(X \times Y) =$ ....

(a) 0 (b) 1 (c) 2 (d) 3

[2] $(\sqrt{5} - 2)(\sqrt{5} + 2) =$ ....

(a) 5 (b) 3 (c) 2 (d) 1

[3] The range of the set of the values : 16, 32, 5, 27 and 20 is ....

(a) 27 (b) 20 (c) 16 (d) 13

[4] The third proportional for the numbers 8, 6, ... and 12 is ....

(a) 24 (b) 20 (c) 16 (d) 8



5 If $X = 3$, $y = 5$, then $y^X =$ ....

(a) 135 (b) 125 (c) 115 (d) 95

6 If $5X = 12$, then $10X =$ ....

(a) 12 (b) 22 (c) 24 (d) 34

2 [a] If $X \times Y = \{(2, 2), (2, 5), (2, 7)\}$

, **find :** 1 Y 2 $Y \times X$

[b] If b is the middle proportional between a and c , **prove that :** $\frac{a-b}{a-c} = \frac{b}{b+c}$

3 [a] If $X = \{2, 3, 5\}$, $Y = \{4, 6, 8, 10\}$ and R is a relation from X to Y where "a R b" means "2 a = b" for each $a \in X$, $b \in Y$

1 Write R and represent it by an arrow diagram.

2 Is R a function ?

[b] If y varies inversely as X and $y = 2$ when $X = 4$

, find the relation between y and X , then find the value of y when $X = 16$

4 [a] If the point (a , 3) is located on the straight line which represents the function $f : \mathbb{R} \longrightarrow \mathbb{R}$ where $f(X) = 4X - 5$, **find the value of :** a

[b] If $\frac{a}{2} = \frac{b}{3} = \frac{c}{4} = \frac{2a - b + 5c}{3X}$, **find the value of :** X

5 [a] Represent graphically the function $f : f(X) = (X - 3)^2$, taking $X \in [0, 6]$ and from the graph deduce the coordinates of the vertex point of the curve , the maximum or minimum value of the function and the equation of the axis of symmetry.

[b] The following frequency distribution shows the number of children of some families in a new city :

Number of children	Zero	1	2	3	4
Number of families	8	16	50	20	6

Calculate the mean and the standard deviation of the number of children.





23 New Valley Governorate

Answer the following questions : (Calculator is allowed)

1 Choose the correct answer from those given :

1 If $\sqrt[3]{x} = \sqrt{16}$, then $x =$ ....

(a) 4 (b) 8 (c) 16 (d) 64

2 If 2 , x , 4 and 6 are proportional , then $x =$ ....

(a) 1 (b) 3 (c) 5 (d) 8

3 If $y = 2x$, then $y \propto$ ....

(a) $\frac{1}{x}$ (b) x (c) $x + 2$ (d) $x - 2$

4 $2^{x-5} = 1$ where $x \in$ ....

(a) 5 (b) $\mathbb{R} - \{5\}$ (c) $\mathbb{R}$ (d) $\{5\}$

5 The middle proportional between 3 and $\frac{1}{3}$ is ....

(a) ± 1 (b) 9 (c) $\frac{1}{9}$ (d) ± 9

6 If $\Sigma (x - \overline{x})^2 = 36$ for a set of values whose number equals 9 , then the standard deviation = ...

(a) 2 (b) 3 (c) 4 (d) 6

2 [a] If $X = \{2 , 3\}$, $Y = \{3 , 4 , 5\}$, **then find :**

1 $X \times Y$ and represent it by an arrow diagram. 2 $n (X \times Y)$

[b] If $x^2 y^2 - 14 x y + 49 = 0$, **then prove that :** $y \propto \frac{1}{x}$

3 [a] Find the negative number which if its square is added to each of the two terms of the ratio 7 : 11 , it becomes 4 : 5

[b] If $X = \{2 , 4 , 8\}$ and R is a relation on X where "a R b" means "a is double b" for each $a \in X$, $b \in X$, write R Is R a function ? and why ?

4 [a] If $\frac{a}{2} = \frac{b}{3} = \frac{c}{4} = \frac{2a - 5b + 3c}{x}$, **then find the value of each of :**

1 x 2 $\frac{a + b + c}{b}$

[b] If the function $f : \mathbb{R} \longrightarrow \mathbb{R}$, $f(x) = 2x - 3$, **then find the value of k if :**

1 $f(k) = 5$ 2 $(2 , k) \in f$

5 **[a] The following frequency distribution shows the numbers of children of some families in a new city :**

Number of children (X)	3	5	7	9	11
Number of families (k)	3	12	21	10	4

Calculate the mean and the standard deviation to the number of children.

[b] Represent graphically the curve of the function f where

$f(X) = (X + 1)^2$, $X \in [-3 , 1]$ **and from the drawing deduce :**

1. The coordinates of the vertex of the curve.
2. The equation of the symmetry axis.
3. The minimum value of the function.

24 South Sinai Governorate



Answer the following questions :

1 **Choose the correct answer :**

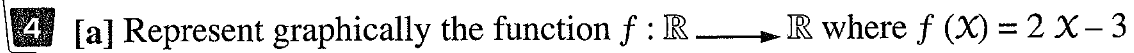
1. The degree of the polynomial function $f : f(X) = X^4 - 2X^2 + 5$ is ....
   (a) fourth. (b) third. (c) second. (d) first.
2. The fourth proportional of 3 , 6 , 6 is ....
   (a) 9 (b) 12 (c) 6 (d) 1
3. If n (X) = 5 and n (X × Y) = 15 , then n (Y) = ...
   (a) 20 (b) 10 (c) 3 (d) 2
4. The arithmetic mean of the values : 3 , 4 , 6 , 7 equals ....
   (a) 40 (b) 20 (c) 10 (d) 5
5. If $y^2 + 4X^2 = 4Xy$, then ....
   (a) $y \propto X$ (b) $y \propto X^2$ (c) $y \propto \frac{1}{X}$ (d) $y \propto \frac{1}{X^2}$
6. If X is an odd number , then the next odd number is ....
   (a) X^2 (b) $X^2 + X$ (c) $X + 6$ (d) $X + 2$

2 If $X = \{2 , 3 , 4\}$ and $Y = \{y : y \in \mathbb{N} , 2 \le y < 9\}$ where $\mathbb{N}$ is the set of natural numbers and R is a relation from X to Y where "a R b" means "$a = \frac{1}{2} b$" , $a \in X$ and $b \in Y$, write R
Is R a function from X to Y ? Then find the range.

3 [a] Find the number which if we added it to each of the two terms of the ratio 7 : 11 , it becomes 2 : 3

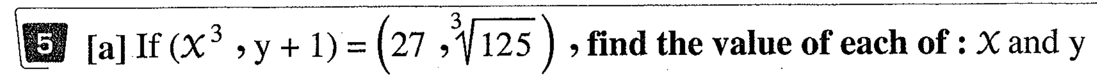


[b] If $y \propto X$ and $y = 14$ when $X = 42$, find the relation between X and y , then find the value of y when $X = 60$



4 **[a]** Represent graphically the function $f : \mathbb{R} \longrightarrow \mathbb{R}$ where $f(X) = 2X - 3$

[b] If b is the middle proportional between a and c , **prove that :** $\frac{a^2 + b^2}{b^2 + c^2} = \frac{a}{c}$



5 **[a]** If $(X^3 , y + 1) = (27 , \sqrt[3]{125})$ **, find the value of each of :** X and y

[b] Calculate the arithmetic mean and the standard deviation for the values :

20 , 17 , 22 , 23 , 18





25 North Sinai Governorate

Answer the following questions :

1 **Choose the correct answer from those given :**

1. If $f(X) = 5$, then $f(5) + f(-5) =$ ....

   (a) zero (b) 5 (c) -5 (d) 10

2. If $(X - 2 , 3) = (5 , 3)$, then $X =$ ....

   (a) 5 (b) 3 (c) 7 (d) 8

3. If f is an odd number , then the next odd number is ....

   (a) f^2 (b) $f + 6$ (c) $f + 2$ (d) $f^2 + 1$

4. The fourth proportional of the quantities 4 , 8 , 8 equals ....

   (a) 4 (b) 8 (c) 12 (d) 16

5. The sum of the two square roots of $2\frac{1}{4}$ equals ....

   (a) $1\frac{1}{2}$ (b) zero (c) $\frac{1}{2}$ (d) $\sqrt{2}$

6. The difference between the greatest value and the smallest value of a set of individuals is called ....

   (a) the range. (b) the arithmetic mean.
   (c) the median. (d) the standard deviation.

2 **[a]** If $X = \{1 , 2 , 3\}$, $Y = \{1 , \frac{1}{2} , \frac{1}{3} , \frac{1}{5}\}$ and R is a relation from X to Y where "a R b" means "a is the multiplicative inverse of b" for all $a \in X$, $b \in Y$, write R and represent it by an arrow diagram. Is R a function or not ?

[b] If $y \propto \frac{1}{X}$ and $y = 3$ when $X = 2$

1. Find the relation between X and y
2. Find the value of y when $X = 1.5$



3 **[a]** If $f(X) = 5X + 4$ is represented graphically by a straight line passing through the point (3 , b) , **then find the value of :** b

[b] If $\frac{X}{y} = \frac{3}{4}$, **find the value of :** $\frac{3X + y}{X + 5y}$

4 **[a]** If $X \times Y = \{(1, 2), (4, 2), (5, 2)\}$, **then find :** X , Y , Y^2

[b] If b is the middle proportional between a and c , **prove that :** $\frac{5c^2 - 2b^2}{5b^2 - 2a^2} = \frac{c}{a}$

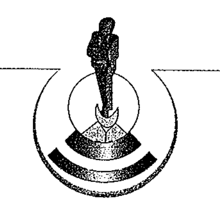
5 **[a] Calculate the standard deviation to the following data :** 12 , 13 , 16 , 18 and 21

[b] Represent graphically the function $f : f(X) = 2 - X^2$, $X \in [-3, 3]$

From the graph deduce :

1. The coordinates of the vertex point of the curve.
2. The equation of the axis of symmetry.
3. The maximum or minimum value of the function.

26 Red Sea Governorate



Answer the following questions : ***(Calculators are allowed)***

1 **Choose the correct answer from those given :**

1. If the point (a – 3 , 5) lies on y-axis , then a = ...
   (a) 5 (b) 3 (c) 2 (d) 0
2. If 2 , 3 , 6 , X are proportional quantities , then X = ...
   (a) 9 (b) 18 (c) 12 (d) 3
3. The range of the set of the values : 3 , 5 , 6 , 7 , 9 equals ....
   (a) 3 (b) 4 (c) 6 (d) 12
4. If $f(X) = 3$, then $f(5) + f(-5)$ = ...
   (a) – 1 (b) 0 (c) 1 (d) 6
5. If $X - y = 5$, $X + y = 1$, then $X^2 - y^2$ = ...
   (a) $\frac{1}{25}$ (b) 1 (c) 5 (d) 25
6. If $X y = 7$, then y ∝ ....
   (a) $\frac{1}{X}$ (b) $X - 7$ (c) $X + 7$ (d) X

2 **[a]** If $X \times Y = \{(1, 1), (1, 5), (1, 7)\}$, **find :**

1. X
2. n (Y)
3. Y × X

[b] If b is the middle proportional between a and c , **prove that :** $\frac{a^2 + b^2}{b^2 + c^2} = \frac{a}{c}$



3 [a] If $f(X) = 4X + a$, $f(2) = 15$, **find the value of :** a

[b] If $X = \{1, 2, 3\}$, $Y = \{1, 2, 3, 4, 5\}$ and R is a relation from X to Y where "a R b" means "a + b = 5" for each $a \in X$, $b \in Y$

1. Write R and represent it by a Cartesian diagram.
2. Is R a function or not ?

4 [a] If $\frac{X}{y} = \frac{2}{3}$, **find the value of :** $\frac{3X + 2y}{6y - X}$

[b] If $y \propto X$ and y = 2 when $X = 6$, **find :**

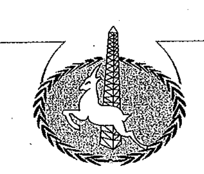
1. The relation between y and X
2. The value of y when $X = 15$

5 [a] Represent graphically the curve of the function f where $f(X) = 4 - X^2$ and $X \in [-3, 3]$, **from the graph deduce :**

1. The coordinates of the vertex of the curve.
2. The equation of the axis of symmetry of the curve.

[b] **Find the standard deviation for the values :** 12 , 13 , 16 , 18 , 26

27 Matrouh Governorate



Answer the following questions : *(Calculators are allowed)*

1 **Choose the correct answer from those given :**

1. If a , b , 2 and 3 are proportional , then $\frac{a}{b} =$ ....
   (a) $\frac{2}{3}$ (b) $\frac{3}{2}$ (c) $\frac{3}{4}$ (d) $\frac{4}{3}$
2. $[1, 4] -]1, 4[=$ ....
   (a) $\{0\}$ (b) $\{1, 4\}$ (c) $[1, 4[$ (d) $\varnothing$
3. If $(2, 5) \in \{3, 2\} \times \{1, X\}$, then $X =$ ....
   (a) 2 (b) 3 (c) 1 (d) 5
4. If $(X - 1, 2^y) = (1, 8)$, then $(X, y) =$ ....
   (a) (2 , 3) (b) (3 , 2) (c) (0 , 3) (d) (0 , – 3)
5. The point (3 , – 4) lies in the .... quadrant.
   (a) first (b) second (c) third (d) fourth
6. If $\Sigma (X - \overline{X})^2 = 36$ for a set of values whose number is 9 , then $\sigma =$ ....
   (a) 2 (b) 4 (c) 18 (d) 27



2 **[a]** If $X = \{1, 2, 3\}$, $Y = \{1, 3, 6, 9, 12\}$ and R is a relation from X to Y where "a R b" means "$a = \frac{1}{3} b$" for all $a \in X$, $b \in Y$, write R and show whether it is a function or not, and if it is a function , write the range.

[b] If $\frac{a}{b} = \frac{2}{5}$, **find the value of :** $\frac{2a - 2b}{3a + 2b}$

3 **[a]** If $X \times Y = \{(1, 1), (1, 3), (1, 5)\}$

, **find :** [1] X , Y [2] Y^2

[b] If $\frac{x}{2a + b} = \frac{y}{2b - c} = \frac{z}{2c - a}$, **prove that :** $\frac{2x + y}{4a + 4b - c} = \frac{2x + 2y + z}{3a + 6b}$

4 **[a]** If the point (a , 3) is located on the straight line which represents the function $f : \mathbb{R} \longrightarrow \mathbb{R}$ where $f(x) = 4x - 5$, **find the value of :** a

[b] The following frequency distribution shows the number of children of some families in a new city :

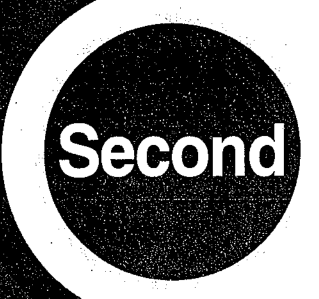
Number of children	Zero	1	2	3	4
Number of families	8	16	50	20	6

Calculate the mean and the standard deviation to the number of children.

5 **[a]** If y varies inversely as x and $y = 10$ when $x = 3$, find the relation between x and y , then find the value of y when $x = 5$

[b] Represent graphically the function $f : f(x) = (x - 3)^2$, $x \in [0, 6]$
From the graph deduce the vertex of the curve , the maximum or minimum value of the function.





Trigonometry and Geometry



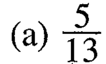


Quizzes

on Trigonometry and Geometry

Quiz 1 on lesson 1 – unit 4





1 **Choose the correct answer from those given :**

1 **In the opposite figure :**

ABC is a triangle in which : m (∠ A) = 90°

, AB = 5 cm. and BC = 13 cm. , then tan B = ...

(a) $\frac{5}{13}$ (b) 2.4 (c) $\frac{13}{5}$ (d) $\frac{25}{12}$

2 If Δ ABC is a right-angled triangle at B and cos A = 0.6 , then sin A = ...

(a) $\frac{4}{5}$ (b) $\frac{3}{5}$ (c) $\frac{5}{4}$ (d) $\frac{5}{3}$

3 For any two acute angles A and B , if m (∠ A) + m (∠ B) = 90° , then ....

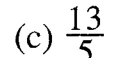
(a) sin A = cos B (b) sin A = sin B

(c) tan A = tan B (d) cos A = cos B

2 ABCD is a trapezium in which : $\overline{AD}$ // $\overline{BC}$, m (∠ B) = 90°

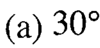
If AB = 4 cm. , AD = 7 cm. , BC = 10 cm.

, **prove that :** cos (∠ DCB) – tan (∠ ACB) = $\frac{1}{5}$



Quiz 2 till lesson 2 – unit 4





1 **Choose the correct answer from those given :**

1 If sin $X = \frac{\sqrt{3}}{2}$ where X is the measure of an acute angle , then X = ...

(a) 30° (b) 45° (c) 60° (d) 90°

2 If Δ ABC is a right-angled triangle at B , sin C = $\frac{3}{5}$ and AB = 6 cm. , then AC = ... cm.

(a) 5 (b) 10 (c) 6 (d) 3

3 If m (∠ A) = 75° , sin B = cos A , where ∠ B is an acute angle , then m (∠ B) = ...

(a) 45° (b) 75° (c) 15° (d) 105°

2 [a] **Without using the calculator , find the value of X that satisfies :**

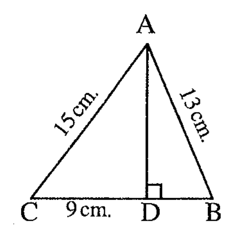
$\sqrt{3}$ tan X = sin 30° cos 60° + cos 30° sin 60° (where X is the measure of an acute angle)

[b] **In the opposite figure :**

$\overline{AD} \perp \overline{BC}$, AB = 13 cm. , AC = 15 cm. , CD = 9 cm.

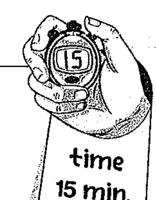
Find in the simplest form the value of the expression :

$$\frac{\tan (\angle CAD) + \tan (\angle BAD)}{\tan (\angle CAD) - \tan (\angle BAD)}$$





Quiz 3 Till lesson 1 – unit 5



1 Choose the correct answer from those given :

1 The distance between the point (2 , – 4) and the X-axis is ……… length unit.

(a) 2 (b) – 4 (c) $2\sqrt{5}$ (d) 4

2 If $\cos 3X = \frac{1}{2}$ where $3X$ is the measure of an acute angle , then $X =$ ………

(a) 10° (b) 20° (c) 60° (d) 90°

3 If the distance between the two points (k , 0) , (0 , 3) is 5 length units , then k = ………

(a) 2 (b) 4 (c) – 4 (d) ± 4

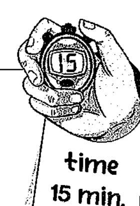
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2 **[a]** If the point A (8 , 9) lies on the circle whose centre is M (2 , 1) , find the area of this circle ($\pi = 3.14$)

[b] XYZ is a right-angled triangle at Y , in which XY = 5 cm. , XZ = 13 cm.

Find the value of : cos X cos Z – sin X sin Z

Quiz 4 Till lesson 2 – unit 5



1 Choose the correct answer from those given :

1 If A (1 , 2) , B (3 , – 4) , then the midpoint of $\overline{AB}$ is ………

(a) (2 , 4) (b) (2 , – 1) (c) (2 , 1) (d) (– 2 , 1)

2 ABC is a triangle in which AB = BC = 5 cm. , AC = $5\sqrt{2}$ cm.

, then tan (∠ C) = ………

(a) $\frac{1}{\sqrt{2}}$ (b) $\frac{1}{2}$ (c) 1 (d) $\frac{\sqrt{3}}{2}$

3 If the origin point is the midpoint of $\overline{AB}$ where A (2 , – 3) , then B = ………

(a) (– 3 , 2) (b) (– 2 , 3) (c) (– 2 , – 3) (d) (2 , 3)

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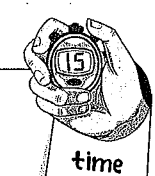
2 **[a]** If A (– 1 , 3) , B (4 , 3) , C (7 , 7)

, **prove that :** Δ ABC is an isosceles triangle and calculate its area.

[b] If $\tan 2X = \frac{2 \tan 30^\circ}{1 - \tan^2 30^\circ}$ where $2X$ is the measure of an acute angle , then find X



Quiz 5 Till lesson 3 – unit 5



1 Choose the correct answer from those given :

1 The straight line which passes through the two points (0 , 0) and (2 , 5) is parallel to the straight line whose slope equals ....

(a) $\frac{5}{2}$ (b) $\frac{2}{5}$ (c) $\frac{-5}{2}$ (d) $\frac{-2}{5}$

2 If ABCD is a square where A (– 1 , – 4) and C (5 , 4) , then the slope of $\overleftrightarrow{BD}$ equals ....

(a) $\frac{4}{3}$ (b) $-\frac{4}{3}$ (c) $-\frac{3}{4}$ (d) $\frac{3}{4}$

3 If $\cos X = \frac{\sqrt{3}}{2}$ where X is the measure of an acute angle , then $\sin 2X =$ ....

(a) 1 (b) $\frac{\sqrt{3}}{2}$ (c) $\frac{1}{2}$ (d) $\frac{1}{\sqrt{2}}$

---

2 [a] **Prove that :** The straight line which passes through the two points (3 , – 2) and (6 , 1) is parallel to the straight line which makes an angle of measure 45° with the positive direction of X-axis.

[b] If A (2 , 2) , B (1 , – 1) , C (– 2 , – 2) and D (– 1 , 1) are four points in a perpendicular coordinates plane , **prove that :** the figure ABCD is a rhombus and find its area.

Quiz 6 Till lesson 4 – unit 5



1 Choose the correct answer from those given :

1 The straight line whose equation is : $2X - 3y = 12$ intercepts from the negative part of y-axis a part of length .... length unit.

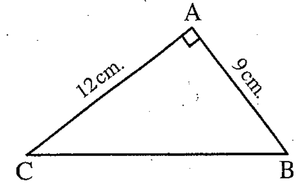
(a) 4 (b) – 4 (c) 12 (d) $\frac{2}{3}$

2 **In the opposite figure :**

$\sin B + \cos C =$ ....

(a) 1 (b) $\frac{8}{5}$

(c) $\frac{6}{5}$ (d) zero



3 The equation of the straight line whose slope equals $\frac{1}{2}$ and intercepts 3 length unit from the negative part of y-axis is ....

(a) $2y = X - 3$ (b) $2y - X - 6 = 0$

(c) $2y - X + 6 = 0$ (d) $2y + X - 6 = 0$

---

2 If the points A (1 , 0) , B (– 1 , 4) , C (7 , 8) and D (9 , 4)

1 **Prove that :** $\overline{BA}$ // $\overline{CD}$ and equal in length.

2 **Prove that :** m (∠ ABC) = 90°

3 **Find :** The equation of the straight line which passes through the two points A and C



Final Revision

of Trigonometry and Geometry



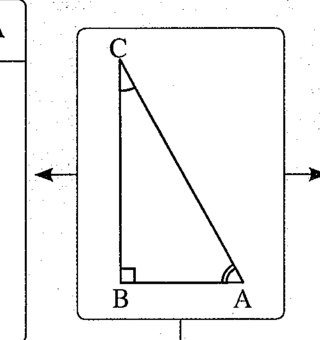
Revision for the important rules and laws of trigonometry and geometry

First Trigonometry

Remember The main trigonometrical ratios of the acute angle and the important relations between them

The trigonometrical ratios of the angle A

- $\sin A = \frac{\text{Opposite}}{\text{Hypotenuse}} = \frac{BC}{AC}$
- $\cos A = \frac{\text{Adjacent}}{\text{Hypotenuse}} = \frac{AB}{AC}$
- $\tan A = \frac{\text{Opposite}}{\text{Adjacent}} = \frac{BC}{AB}$



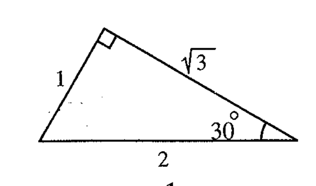
The trigonometrical ratios of the angle C

- $\sin C = \frac{\text{Opposite}}{\text{Hypotenuse}} = \frac{AB}{AC}$
- $\cos C = \frac{\text{Adjacent}}{\text{Hypotenuse}} = \frac{BC}{AC}$
- $\tan C = \frac{\text{Opposite}}{\text{Adjacent}} = \frac{AB}{BC}$

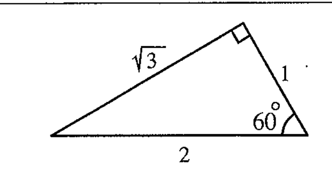
Some important relations

- $\tan A = \frac{\sin A}{\cos A}$
- If $m(\angle A) + m(\angle C) = 90°$, then $\sin A = \cos C$, $\cos A = \sin C$
- If $\sin A = \cos C$ or $\cos A = \sin C$, then $m(\angle A) + m(\angle C) = 90°$

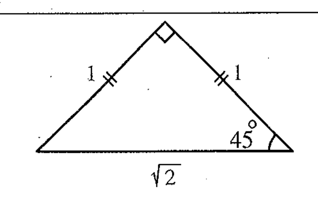
Remember The trigonometrical ratios of some angles



- $\sin 30° = \frac{1}{2}$
- $\cos 30° = \frac{\sqrt{3}}{2}$
- $\tan 30° = \frac{1}{\sqrt{3}}$



- $\sin 60° = \frac{\sqrt{3}}{2}$
- $\cos 60° = \frac{1}{2}$
- $\tan 60° = \sqrt{3}$



- $\sin 45° = \frac{1}{\sqrt{2}}$
- $\cos 45° = \frac{1}{\sqrt{2}}$
- $\tan 45° = 1$

Notice that

If $\cos \theta = 0.7152$, then we use the calculator to find θ by using the keys as the following sequence from left : SHIFT cos . 7 1 5 2 = °,,,

Then $\theta \simeq 44° \, 20' \, 25''$



Second Analytical geometry

Remember The important laws

If $A(x_1, y_1)$, $B(x_2, y_2)$

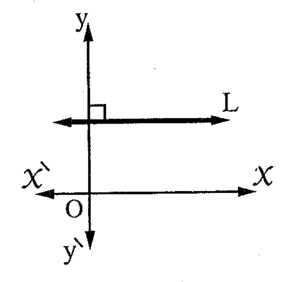
- The law of the distance between the two points A , B (the length of $\overline{AB}$) :
  $AB = \sqrt{(\text{difference between } x\text{-coordinates})^2 + (\text{difference between y-coordinates})^2}$
- The law of finding the coordinates of the midpoint of $\overline{AB}$:
  The midpoint of $\overline{AB} = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$
- The law of finding the slope of the straight line $\overleftrightarrow{AB}$:
  $m = \frac{y_2 - y_1}{x_2 - x_1}$

Remember How to find the slope of the straight line

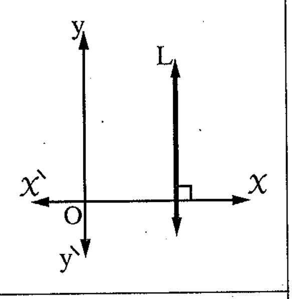
1. Given two points on the line as : $A(x_1, y_1)$, $B(x_2, y_2)$ → $m = \frac{y_2 - y_1}{x_2 - x_1}$
2. Given the measure of the positive angle which the straight line makes with the positive direction of x-axis , say θ → $m = \tan \theta$
3. Given the equation of the straight line in the form : $y = b\,x + c$ → $m = b$ where b is the coefficient of x
4. Given the equation of the straight line in the form : $a\,x + b\,y + c = 0$ → $m = \frac{-\text{coefficient of } x}{\text{coefficient of y}} = \frac{-a}{b}$
5. Given the slope of the parallel straight line to it , say m_1 → $m = m_1$ because the two slopes are equal.
6. Given the slope of the perpendicular straight line to it , say m_2 → $m = \frac{-1}{m_2}$ because : $m \times m_2 = -1$

Important remarks on the slope of the straight line

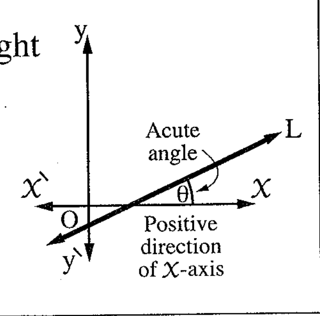
- The slope of x-axis equals 0
- The slope of the straight line parallel to x-axis equals 0



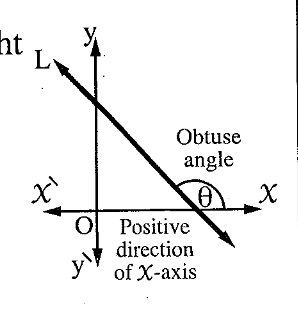
- The slope of y-axis is undefined.
- The slope of the straight line parallel to y-axis is undefined.



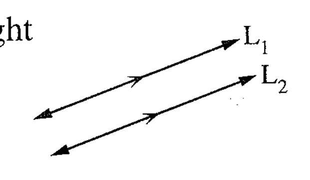
- The slope of the straight line which makes an acute angle with the positive direction of x-axis is positive.



- The slope of the straight line which makes an obtuse angle with the positive direction of x-axis is negative.

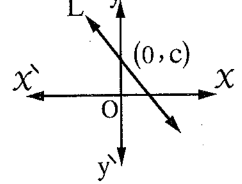


- The two parallel straight lines their slopes are equal.



i.e. If $L_1 // L_2$, then $m_1 = m_2$

- The two perpendicular straight lines the product of their slopes equals – 1



i.e. If $L_1 \perp L_2$, then $m_1 \times m_2 = -1$

Remember — The equation of the straight line

- The equation of the straight line whose slope = m and cuts y-axis at the point (0 , c) is :

  $y = m x + c$

For example :

- The equation of the straight line whose slope is – 2 and cuts from the positive part of y-axis 7 units is : $y = -2x + 7$
- To find the equation of the straight line whose slope is 3 and passes through the point (1 , – 2) :

  $\because$ The slope = 3 $\quad\therefore$ The equation of the straight line is : $y = 3x + c$

  , then substitute by the point (1 , – 2) to find the value of c as the following :

  $-2 = 3 \times 1 + c$, then : $c = -5$

  $\therefore$ The equation of the straight line is : $y = 3x - 5$



Important remarks on the equation of the straight line

1. The equation of the straight line which passes through the origin point O (0 , 0) is : $y = m\,x$ where m is the slope.
2. The equation of x-axis is : $y = 0$ and the equation of y-axis is : $x = 0$
3. The equation of the straight line parallel to x-axis and cuts y-axis at the point (0 , c) is : $y = c$
4. The equation of the straight line parallel to y-axis and cuts x-axis at the point (a , 0) is : $x = a$

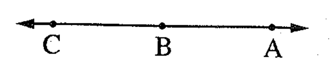
Remember — Some rules and remarks which help you to solve the exercises

1 To prove that the points A , B and C are collinear

We will prove that :

- The slope of $\overleftrightarrow{AB}$ = the slope of $\overleftrightarrow{BC}$

or • $AB + BC = AC$ (where AC is the greatest length)

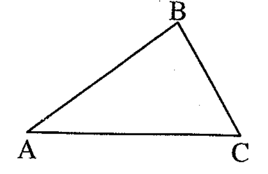


2 To prove that the points A , B and C are vertices of a triangle

We prove that :

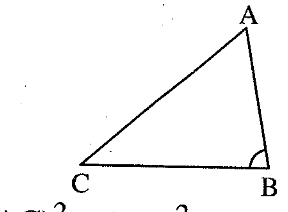
- The slope of $\overleftrightarrow{AB} \neq$ the slope of $\overleftrightarrow{BC}$

or • $AB + BC > AC$ (where AC is the greatest length)



3 To determine the type of the triangle ABC according to its angle measures

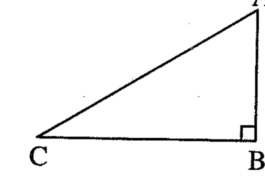
We compare between : $(AC)^2$, $(AB)^2 + (BC)^2$ where $\overline{AC}$ is the longest side , if :



$(AC)^2 < (AB)^2 + (BC)^2$

, then :

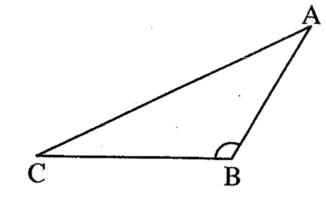
Δ ABC is acute-angled.



$(AC)^2 = (AB)^2 + (BC)^2$

, then :

Δ ABC is right-angled at B



$(AC)^2 > (AB)^2 + (BC)^2$

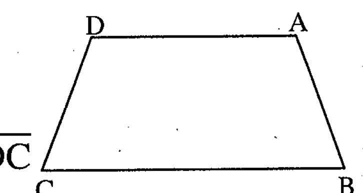
, then :

Δ ABC is obtuse-angled at B



❹ To prove that the quadrilateral ABCD is a trapezium

We prove that :



The slope of $\overleftrightarrow{AD}$ = the slope of $\overleftrightarrow{BC}$, then $\overline{AD} \parallel \overline{BC}$

, the slope of $\overleftrightarrow{AB} \neq$ the slope of $\overleftrightarrow{DC}$, then $\overline{AB}$ is not parallel to $\overline{DC}$

❺ To prove that the quadrilateral ABCD is a parallelogram

- **By using the slope , we prove that :**

  The slope of $\overleftrightarrow{AD}$ = the slope of $\overleftrightarrow{BC}$, then $\overline{AD} \parallel \overline{BC}$

  , the slope of $\overleftrightarrow{AB}$ = the slope of $\overleftrightarrow{DC}$, then $\overline{AB} \parallel \overline{DC}$

- **By using the distance between two points , we prove that :**

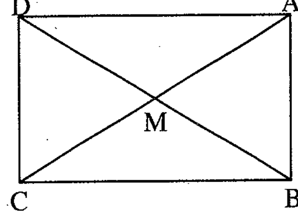
  The length of $\overline{AD}$ = the length of $\overline{BC}$, the length of $\overline{AB}$ = the length of $\overline{DC}$

- **By using the midpoint of a line segment , we prove that :**

  The midpoint of $\overline{AC}$ is the midpoint of $\overline{BD}$, then : $\overline{AC}$, $\overline{BD}$ bisect each other.



❻ To prove that the quadrilateral ABCD is a rectangle



* **First we prove that :** The quadrilateral ABCD is a parallelogram by one of the previous methods

, then prove that :

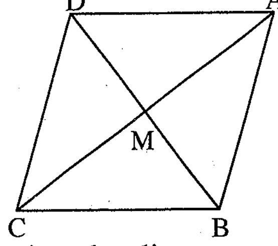
- AC = BD (By using the distance between two points)

or

- The slope of $\overleftrightarrow{AB}$ × the slope of $\overleftrightarrow{BC}$ = – 1 , then : $\overline{AB} \perp \overline{BC}$

❼ To prove that the quadrilateral ABCD is a rhombus

* **First we prove that :** The quadrilateral ABCD is a parallelogram



, then prove that :

- AB = BC (By using the distance between two points)

or • The slope of $\overleftrightarrow{AC}$ × the slope of $\overleftrightarrow{BD}$ = – 1 , then $\overline{AC} \perp \overline{BD}$

* We can prove that the quadrilateral ABCD is a rhombus directly by using the distance between two points

We prove that :

AB = BC = CD = DA



8 To prove that the quadrilateral ABCD is a square

* **First we prove that :** The quadrilateral ABCD is a parallelogram

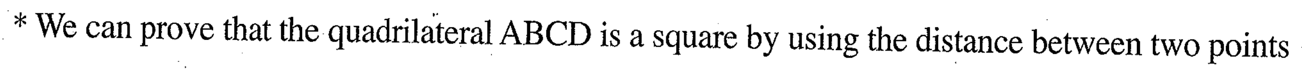
, then prove that :

- AB = BC (By using the distance between two points)

and the slope of $\overleftrightarrow{AB}$ × the slope of $\overleftrightarrow{BC}$ = – 1 , then $\overline{AB} \perp \overline{BC}$

or • AC = BD (By using the distance between two points)

and the slope of $\overleftrightarrow{AC}$ × the slope of $\overleftrightarrow{BD}$ = – 1 , then $\overline{AC} \perp \overline{BD}$

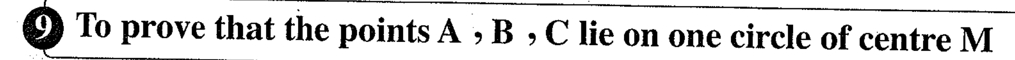


* We can prove that the quadrilateral ABCD is a square by using the distance between two points

We prove that :

AB = BC = CD = DA , then the quadrilateral is a rhombus

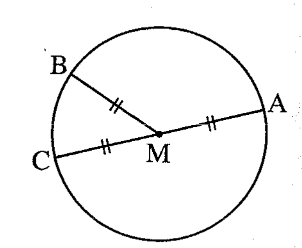
, then prove that : AC = BD



9 To prove that the points A , B , C lie on one circle of centre M

By using the distance between two points

We prove that : MA = MB = MC





Final Examinations

on Trigonometry and Geometry

Model 1

Answer the following questions :

1 **Choose the correct answer from those given :**

1 $\tan 45° =$ ....

(a) 1 (b) $2\sqrt{2}$ (c) $\frac{1}{2}$ (d) $\sqrt{2}$

2 If $\sin X = \frac{1}{2}$, X is an acute angle , then m $(\angle X) =$ ....

(a) 45° (b) 60° (c) 30° (d) 90°

3 The distance between the two points (3 , 0) and (0 , – 4) equals .... length units.

(a) 4 (b) 5 (c) 6 (d) 7

4 If $X + y = 5$, $k X + 2 y = 0$ are perpendicular , then k = ...

(a) – 2 (b) – 1 (c) 1 (d) 2

5 If A (5 , 7) , B (1 , – 1) , then the midpoint of $\overline{AB}$ is ....

(a) (2 , 3) (b) (3 , 3) (c) (3 , 2) (d) (3 , 4)

6 The equation of the straight line which passes through the point (3 , – 5) and parallel to y-axis is ....

(a) $X = 3$ (b) $y = -5$ (c) $y = 2$ (d) $X = -5$

2 **[a] Without using calculator , prove that :** $\sin 60° = 2 \sin 30° \cos 30°$

[b] Prove that : The points A (– 3 , – 1) , B (6 , 5) and C (3 , 3) are collinear.

3 **[a]** If $4 \cos 60° \sin 30° = \tan X$, find the value of X , where X is an acute angle.

[b] If the midpoint of $\overline{AB}$ is C (6 , – 4) where A (5 , – 3) , **find the point :** B

4 **[a]** If the straight line L_1 passes through the points (3 , 1) , (2 , k) and the straight line L_2 makes with the positive direction of the X-axis an angle of measure 45° , find the value of k if $L_1 // L_2$

[b] ABC is a right-angled triangle at C , AC = 6 cm. , BC = 8 cm.

Find : 1 $\cos A \cos B - \sin A \sin B$

2 m $(\angle B)$



5 [a] Find the equation of the straight line whose slope is 2 and passes through the point (1 , 0)

[b] **Prove that :** The points A (3 , – 1) , B (– 4 , 6) and C (2 , – 2) which belongs to an orthogonal Cartesian coordinates plane lie on the circle whose centre is M (– 1 , 2) Find the circumference of the circle.

Model 2

Answer the following questions :

1 **Choose the correct answer from those given :**

1. $2 \sin 30° \tan 60° =$ ....

   (a) $\sqrt{3}$ (b) 3 (c) $\frac{\sqrt{3}}{3}$ (d) $\frac{1}{2}$

2. The equation of the straight line which passes through the point (– 2 , – 3) and parallel to X-axis is ....

   (a) $X = -2$ (b) $X = -3$ (c) $y = -2$ (d) $y = -3$

3. If $\cos X = \frac{\sqrt{3}}{2}$, X is an acute angle , then $\sin 2X =$ ....

   (a) 1 (b) $\frac{\sqrt{3}}{2}$ (c) – 2 (d) $\frac{1}{\sqrt{3}}$

4. A circle of centre at the origin point and its radius length is 2 length units , which of the following points belongs to the circle ?

   (a) (1 , – 2) (b) $\left(-2 , \sqrt{5}\right)$ (c) $\left(\sqrt{3} , 1\right)$ (d) (0 , 1)

5. The perpendicular distance between the two straight lines : $X - 2 = 0$, $X + 3 = 0$ equals .... length units.

   (a) 1 (b) 5 (c) 2 (d) 3

6. If $\frac{-3}{2}$, $\frac{6}{k}$ are the slopes of two parallel straight lines , then k = ...

   (a) 6 (b) – 4 (c) $\frac{3}{2}$ (d) 2

2 [a] If $\cos E \tan 30° = \cos^2 45°$, find m (∠ E) , E is an acute angle.

[b] Show the type of the triangle whose vertices are A (3 , 3) , B (1 , 5) and C (1 , 3) due to its side lengths.

3 [a] Find the equation of the straight line which passes through the points (1 , 3) and (– 1 , – 3) and prove that it is passing through the origin point.

[b] If the point (3 , 1) is the midpoint of (1 , y) , (X , 3) , find the point (X , y)



4 **[a]** Find the equation of the straight line which intercepts the two axes two positive parts of lengths 1 and 4 for x and y axes respectively and find its slope.

[b] ABC is a right-angled triangle at B , AC = 10 cm. and BC = 8 cm.

Prove that : $\sin^2 A + 1 = 2 \cos^2 C + \cos^2 A$

5 **[a] Prove that :** The straight line which passes through the points (– 1 , 3) , (2 , 4) is parallel to the straight line : $3y - x - 1 = 0$

[b] ABCD is a trapezium , $\overline{AD} \parallel \overline{BC}$, m (∠ B) = 90° , AB = 3 cm. , BC = 6 cm. and AD = 2 cm.

Find the length of $\overline{DC}$ and the value of cos (∠ BCD)



Model for the merge students

Answer the following questions :

1 Put (✓) or (✗) :

1 The distance between the points (9 , 0) , (4 , 0) equals 5 length units. ( )

2 If tan E = 1 , then m (∠ E) = 45° ( )

3 The straight line $y = 2x + 1$ intercepts a part of length – 1 from y-axis ( )

4 If $\overleftrightarrow{AB} \perp \overleftrightarrow{CD}$, then the slope of $\overleftrightarrow{AB}$ × the slope of $\overleftrightarrow{CD}$ = 1
(both of $\overleftrightarrow{AB}$ and $\overleftrightarrow{CD}$ aren't parallel to any axis) ( )

5 $\tan 60° = \frac{1}{\sqrt{3}}$ ( )

6 If A (1 , 2) , B (3 , 4) , then the midpoint of $\overline{AB}$ is (2 , 3) ( )

2 Choose the correct answer from those given :

1 The distance between the point (4 , 3) and x-axis is .... length units.

(a) – 3 (b) 3 (c) 4 (d) – 4

2 4 cos 30° tan 60° = ...

(a) 3 (b) $2\sqrt{3}$ (c) 6 (d) 12

3 If $x + y = 5$, $kx + 2y = 0$ are parallel , then k = ...

(a) – 2 (b) – 1 (c) 1 (d) 2

4 The points (0 , 1) , (3 , 0) and (0 , 4) ....

(a) form a right-angled triangle. (b) form an acute-angled triangle.

(c) form an obtuse-angled triangle. (d) are collinear.

5 If $\overleftrightarrow{AB} // \overleftrightarrow{CD}$ and the slope of $\overleftrightarrow{AB} = \frac{2}{3}$, then the slope of $\overleftrightarrow{CD}$ = ...

(a) $\frac{2}{3}$ (b) $\frac{3}{2}$ (c) $\frac{-2}{3}$ (d) $\frac{-3}{2}$

6 If $\sin x = \frac{1}{2}$, x is an acute angle , then $\sin 2x$ = ...

(a) 1 (b) $\frac{1}{4}$ (c) $\frac{\sqrt{3}}{2}$ (d) $\frac{1}{\sqrt{3}}$



3 Join from column (A) to column (B) :

(A)	(B)
1 The slope of the straight line which is parallel to X-axis is	• 10
2 $\sin^2 30° + \cos^2 30°$ = ...	• 0
3 If ABCD is a rectangle where A (– 1 , – 4) , C (5 , 4) , then the length of $\overline{BD}$ = ... length units.	• 1
4 The equation of the straight line which passes through the origin point and its slope is 2 is y = ... X	• – 3
5 The equation of the straight line which passes through the point (2 , – 3) and parallel to X-axis is y = ...	• 2
6 The value of : $\frac{2 \tan 30°}{1 + \tan^2 30°}$ = ...	• $\frac{\sqrt{3}}{2}$

4 Complete the following :

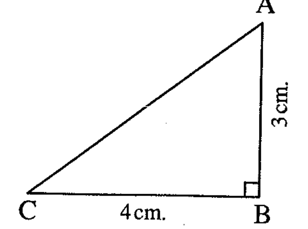
1 If $\overline{AB}$ // $\overline{CD}$ and the slope of $\overleftrightarrow{AB} = \frac{1}{2}$, then the slope of $\overleftrightarrow{CD}$ = ...

2 **In the opposite figure :**

ABC is a right-angled triangle at B

, AB = 3 cm. and BC = 4 cm.

, then sin C = ...



3 If the point (0 , a) belongs to the straight line : $3X - 4y = -12$, then a = ...

4 If $X \cos 60° = \tan 45°$, then X = ...

5 The distance between the point (4 , 3) and the origin point in the coordinates plane is ....

6 If the origin point is the midpoint of $\overline{AB}$ where A (5 , – 2)

, then B (.............. , ...)

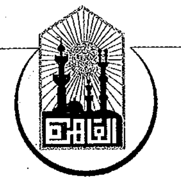




Governorates' Examinations on Trigonometry and Geometry



1 Cairo Governorate



Answer the following questions : (*Calculator is allowed*)

1 **Choose the correct answer from those given :**

1. If $\overleftrightarrow{AB} \perp \overleftrightarrow{CD}$ and the slope of $\overleftrightarrow{AB} = \frac{1}{2}$, then the slope of $\overleftrightarrow{CD} =$ ....
   (a) 2 (b) $\frac{1}{2}$ (c) $-\frac{1}{2}$ (d) -2

2. The number of symmetry axes of an isosceles triangle equals ....
   (a) 1 (b) 2 (c) 3 (d) 4

3. $\tan 60° \tan 30° =$ ....
   (a) $\sin 30°$ (b) $\tan 30°$ (c) $\tan 45°$ (d) $\cos 60°$

4. The sum of the measures of the interior angles of the quadrilateral equals ....
   (a) 540° (b) 360° (c) 180° (d) 90°

5. The equation of the straight line which passes through the point (2 , 3) and is parallel to X-axis is ....
   (a) $X = 2$ (b) $X = 3$ (c) $y = 2$ (d) $y = 3$

6. The perimeter of the square whose surface area is 100 cm^2 equals .... cm.
   (a) 10 (b) 20 (c) 40 (d) 50

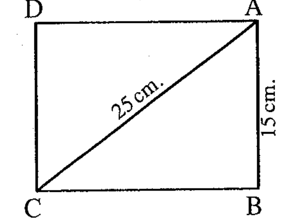
2 **[a]** If $X \sin 45° \cos 45° = \sin 30°$, find the value of X (Showing the steps of the solution).

[b] Find the equation of the straight line which its slope is 2 and passes through the point (1 , 0)

3 **[a]** XYZ is a right-angled triangle at Y in which XY = 6 cm. , YZ = 8 cm.
Find the value of : $\cos X \cos Z - \sin X \sin Z$

[b] ABCD is a quadrilateral , where A (2 , 4) , B (– 3 , 0) , C (– 7 , 5) , D (– 2 , 9)
Prove that : The figure ABCD is a square.

4 **[a] In the opposite figure :**



ABCD is a rectangle , AB = 15 cm.
, AC = 25 cm.
Find : 1. The length of $\overline{BC}$ 2. m (∠ ACB)
3. The area of the rectangle ABCD

[b] If C (6 , – 4) is the midpoint of $\overline{AB}$ where A (5 , – 3) , find the coordinates of the point B

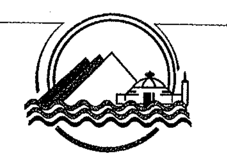




5 **[a]** If the straight line whose equation is a $x + 2y - 7 = 0$ is parallel to the straight line which makes an angle of measure 45° with the positive direction of x-axis , find the value of a

[b] Find the equation of the straight line which passes through the two points (4 , 2) , (– 2 , – 1) , then prove that it passes through the origin point.

2 Giza Governorate



Answer the following questions :

1 **Choose the correct answer :**

1. If $\sin x = \frac{1}{2}$ where x is an acute angle , then $\sin 2x =$ ....
   (a) $\frac{1}{4}$ (b) 1 (c) $\frac{1}{\sqrt{3}}$ (d) $\frac{\sqrt{3}}{2}$

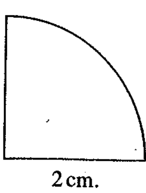
2. The distance between the point (4 , 3) and y-axis equals .... length unit.
   (a) – 3 (b) – 4 (c) 3 (d) 4

3. The points (8 , 0) , (0 , 6) , (0 , 0) ....
   (a) form a right-angled triangle. (b) form an obtuse-angled triangle.
   (c) form an acute-angled triangle. (d) are collinear.

4. If A (5 , 7) , B (1 , – 1) , then the midpoint of $\overline{AB}$ is ....
   (a) (2 , 3) (b) (3 , 3) (c) (3 , 2) (d) (3 , 4)

5. The equation of the straight line which passes through the point (1 , – 3) and is parallel to x-axis is ....
   (a) $x = 3$ (b) $y = 1$ (c) $y = -3$ (d) $x = -3$

6. The opposite figure represents a quarter of a circle with radius 2 cm. long , then its perimeter = ... cm.
   (a) 2π (b) 5π
   (c) $\pi + 4$ (d) $4\pi + 4$



2 **[a]** Find the equation of the straight line which its slope is 2 and passes through the point (1 , – 1)

[b] ABC is a right-angled triangle at C in which AC = 3 cm. , BC = 4 cm. **Find :**

1. $\cos A \cos B - \sin A \sin B$
2. m (∠ B)

3 **[a]** **Without using calculator , prove that :** $\sin 60° = 2 \sin 30° \cos 30°$

[b] If the straight line L_1 passes through the two points (3 , 1) , (2 , k) and the straight line L_2 makes with the positive direction of the x-axis an angle of measure 45° , find the value of k if $L_1 \perp L_2$



4 [a] If $\cos E \tan 30^\circ = \cos^2 45^\circ$, then find m ($\angle$ E) where E is an acute angle.

[b] Show the type of the triangle whose vertices are the points :
A (3 , 3) , B (1 , 5) , C (1 , 3) with respect to its side lengths.

5 [a] Find the slope of the straight line $5X + 4y + 10 = 0$, then find the length of the y-intercept.

[b] Prove that the points A (3 , – 1) , B (– 4 , 6) , C (2 , – 2) which belong to a perpendicular coordinates plane passing through the circle whose centre is the point M (– 1 , 2) , then find the area of the circle.



3 Alexandria Governorate



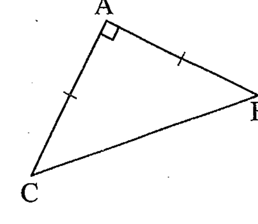
Answer the following questions : (Calculators are permitted)

1 **Choose the correct answer from those given :**

1 If $\overleftrightarrow{AB} \parallel \overleftrightarrow{CD}$ and the slope of $\overleftrightarrow{AB} = \frac{2}{3}$, then the slope of $\overleftrightarrow{CD} =$ ....

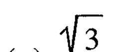
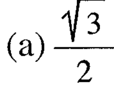
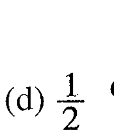
(a) $\frac{3}{2}$ (b) $\frac{2}{3}$ (c) $\frac{-3}{2}$ (d) $\frac{-2}{3}$

2 **In the opposite figure :**



ABC is an isosceles triangle and a right-angled triangle at A

, then tan C = ...

(a) $\frac{\sqrt{3}}{2}$ (b) $\frac{1}{\sqrt{3}}$ (c) 1 (d) $\frac{1}{2}$

3 If A , B are two acute angles and m ($\angle$ A) + m ($\angle$ B) = 90° , m ($\angle$ A) $\neq$ m ($\angle$ B)
, then ....

(a) sin A = cos B (b) sin A = sin B
(c) tan A = tan B (d) cos A = cos B

4 A circle of centre at the origin point and its radius length is 2 length unit , then the point .... belongs to it.

(a) (1 , – 2) (b) $\left(-2 , \sqrt{5}\right)$ (c) (0 , 1) (d) $\left(\sqrt{3} , 1\right)$

5 If X , Y are two supplementary angles and m ($\angle$ X) = m ($\angle$ Y) , then m ($\angle$ X) = ...°

(a) 30 (b) 45 (c) 60 (d) 90

6 The parallelogram whose diagonals are equal in length and perpendicular is the ....

(a) square. (b) rhombus. (c) rectangle. (d) trapezium.



2 **[a] Find the value of X which satisfies :** $X \sin 30° \cos^2 45° = \sin^2 60°$

[b] ABCD is a parallelogram where A (3 , 2) , B (4 , – 5) , C (0 , – 3) Find the two coordinates of the point at which the two diagonals intersect , then find the coordinates of the point D

3 **[a]** Prove that the points A (3 , – 1) , B (– 4 , 6) and C (2 , – 2) are located on a circle whose centre is the point M (– 1 , 2) , then find the circumference of the circle. ($\pi = 3.14$)

[b] Find the equation of the straight line which is perpendicular to the straight line whose equation is $X + 2y + 5 = 0$ and intercepts a positive part from y-axis that is equal to 7 units.

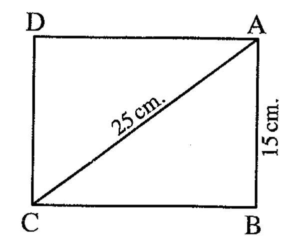
4 **[a]** Prove that the straight line passing through the two points (– 3 , – 2) , (4 , 5) is parallel to the straight line that makes with the positive direction of the X-axis an angle of measure 45°

[b] ABC is a right-angled triangle at C , AC = 6 cm. , BC = 8 cm.

Find the value of : cos A cos B – sin A sin B

5 **[a]** Let A (4 , – 6) , B (3 , 7) and C (1 , – 3) Find the equation of the straight line which passes through A and the midpoint of $\overline{BC}$

[b] In the opposite figure :



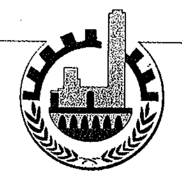
ABCD is a rectangle where AB = 15 cm.

, AC = 25 cm.

Find : [1] m (∠ ACB)

[2] The surface area of the rectangle ABCD

4 El-Kalyoubia Governorate



Answer the following questions :

1 **Choose the correct answer :**

[1] If $\cos \frac{X}{2} = \frac{1}{2}$ where $\frac{X}{2}$ is the measure of a positive acute angle , then X = ... °

(a) 30 (b) 90 (c) 60 (d) 120

[2] The triangle whose area is 24 cm² and its height is 8 cm. , then the length of the base corresponding to this height is .... cm.

(a) 16 (b) 6 (c) 3 (d) 2



3 If $\overleftrightarrow{CD}$ is parallel to y-axis where C (k , 4) , D (– 5 , 7) , then k = ...

(a) 5 (b) 7 (c) – 5 (d) 4

4 The equation of the straight line passing through the origin point and its slope = 1 is ....

(a) $y = X$ (b) $y = -X$ (c) $y = 2X$ (d) $y = 0$

5 If the point (0 , a) belongs to the straight line $3X - 4y + 12 = 0$, then a = ...

(a) 4 (b) – 3 (c) 3 (d) – 4

6 In Δ ABC , if $(AB)^2 > (BC)^2 + (AC)^2$, then $\angle$ C is .... angle.

(a) an acute (b) a right (c) an obtuse (d) a straight

---

2 [a] If the distance of the point $(X , 5)$ from the point (6 , 1) equals $2\sqrt{5}$ length unit , then find the value of X

[b] **Without using the calculator , find the numerical value of the expression :**

$\sin 45° \cos 45° + \sin 30° \cos 60° - \cos^2 30°$

---

3 [a] ABCD is a parallelogram where A (3 , 2) , B (4 , – 5) , C (0 , – 3)

Find the two coordinates of the point at which the two diagonals intersect , then find the coordinates of the point D

[b] ABC is a right-angled triangle at B in which AC = 10 cm. , BC = 8 cm.

Prove that : $\sin^2 A + 1 = 2\cos^2 C + \cos^2 A$

---

4 [a] If the straight line L_1 passes through the two points (3 , 1) and (2 , k) and the straight line L_2 makes with the positive direction of the X-axis an angle of measure 45° , then find k if $L_1 // L_2$

[b] Find the equation of the straight line passing through the point (1 , 2) and perpendicular to the straight line $X + 3y + 7 = 0$

---

5 [a] **In the opposite figure :**

ABCD is a rectangle in which

AB = 15 cm. and AC = 25 cm.

Find : 1 m ($\angle$ ACB)

2 The surface area of the rectangle ABCD

[b] Find the equation of the straight line which intersects from the X and y axes two positive parts whose lengths are 4 and 9 length units respectively.





5 El-Sharkia Governorate



Answer the following questions : (Calculator is allowed)

1 Choose the correct answer from those given :

1. If $\cos(X + 25°) = \frac{1}{2}$, X is the measure of an acute angle , then X = ...°
   (a) 20 (b) 35 (c) zero (d) 5

2. The straight line whose equation is $3y = 2X - 6$, its slope = ...
   (a) 2 (b) $\frac{2}{3}$ (c) 6 (d) $\frac{3}{2}$

3. The equation of the straight line which passes through the origin point and makes with the positive direction of X-axis an angle of measure 60° is ....
   (a) $X = 3y$ (b) $y = \sqrt{3}X + 2$ (c) $y = 3X$ (d) $y = \sqrt{3}X$

4. If ABC is a right-angled triangle at B and $\sin A = \frac{2}{7}$, then $\cos C$ = ...
   (a) $\frac{2}{7}$ (b) $\frac{3}{7}$ (c) $\frac{4}{7}$ (d) $\frac{5}{7}$

5. The distance between the point $A(\sqrt{2}, 4)$ and the origin point equals .... length unit.
   (a) $\sqrt{2}$ (b) $2\sqrt{2}$ (c) $3\sqrt{2}$ (d) $4\sqrt{2}$

6. If the slope of the straight line L_1 is $\frac{a}{5}$ and the slope of the straight line L_2 is $\frac{-b}{3}$ where $a, b \neq 0$ and $L_1 \perp L_2$, then $a\,b$ = ...
   (a) $\frac{3}{5}$ (b) $\frac{-3}{5}$ (c) 15 (d) -15

2 [a] **Without using the calculator , prove that :** $\frac{\sin 30° \sin 60°}{\sin 45° \cos 45°} = \cos 30°$

[b] Prove that the points A (3 , – 1) , B (– 4 , 6) , C (2 , – 2) which belong to an orthogonal Cartesian coordinates plane lie on the circle whose centre is M (– 1 , 2) , then find the circumference of the circle.

3 [a] If A (5 , 1) , B (3 , – 7) , C (1 , 3) are three noncollinear points , find the equation of the straight line which passes through the point A and is parallel to $\overleftrightarrow{BC}$

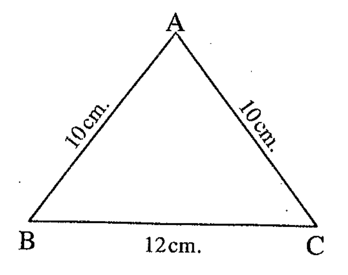
[b] In the opposite figure :

ABC is an isosceles triangle where

AB = AC = 10 cm. , BC = 12 cm.

Find : 1 sin B

2 The area of the triangle ABC



 [a] If ABCD is a parallelogram , A (3 , 3) , B (2 , – 2) , C (5 , – 1)

, **find :** [1] The coordinates of the point of intersection of the two diagonals.

[2] The coordinates of the point D

[b] Find the equation of the straight line which passes through the two points (4 , 5) , (0 , 3) , then find the coordinates of the intersection point of the straight line with X-axis.

 [a] If $\cos X = \sin 30° \cos 60°$

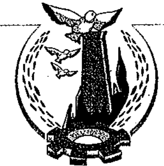
, **find :** [1] The measure of angle X (where X is an acute angle).

[2] $\tan X$

[b] Find the equation of the straight line which cuts 3 units from the positive part of y-axis and is perpendicular to the straight line $\frac{X}{2} + \frac{y}{3} = 1$



El-Monofia Governorate



Answer the following questions : (Using calculator is permitted)

1 Choose the correct answer :

[1] If $\cos (X + 15)° = \frac{1}{2}$, then $\sin (75 - X)° =$ ....

(a) $\frac{1}{2}$ (b) $\frac{\sqrt{3}}{2}$ (c) $\frac{1}{\sqrt{2}}$ (d) 1

[2] A circle is drawn inside a square where the circle touches its four sides. If the perimeter of the square is 56 cm. , then the surface area of the circle is .... cm^2.

(a) $\frac{77}{2}$ (b) 77 (c) 112 (d) 154

[3] The number of sides of the regular polygon in which the measure of one of its interior angles is 144° equals .... sides.

(a) 7 (b) 8 (c) 9 (d) 10

[4] An isosceles triangle , the lengths of its sides may be 4 cm. , 9 cm. , ... cm.

(a) 4 (b) 9 (c) 13 (d) 36

[5] The distance between the point (– 2 , – 3) and X-axis equals .... length units.

(a) 2 (b) 3 (c) – 2 (d) – 3

[6] The equation of the straight line which its slope = $\frac{1}{2}$ and cuts the y-axis at the point (0 , 3) is ....

(a) $2y = \frac{1}{2} X + 6$ (b) $y = \frac{1}{2} X$

(c) $y = \frac{1}{2} X + 3$ (d) $2y = \frac{1}{2} X + 3$



2 [a] **Without using calculator , find the numerical value of the expression :**

$\sin 30° \cos 60° + \cos 30° \sin 60° - \tan^2 45°$

[b] $\overline{AB}$ is a diameter in circle M , if A (7 , – 3) and B (5 , 1) where $\pi = 3.14$, **find :**

1 The surface area of the circle.

2 The coordinates of the centre of circle M

3 [a] ABC is a right-angled triangle at A , AB = 5 cm. and BC = 13 cm.

Find the numerical value of the expression : $\sin C \cos B + \cos C \sin B$

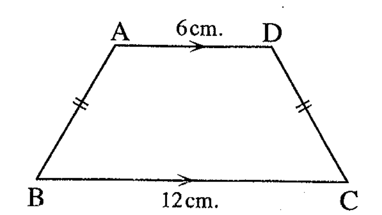
[b] Find the equation of the straight line which passes through the point (1 , 3) and is perpendicular to the straight line passing through the two points (5 , 0) and (2 , 1)

4 [a] **In the opposite figure :**

ABCD is an isosceles trapezium , its area = 36 cm.^{2}

, $\overline{AD} // \overline{BC}$, AD = 6 cm. and BC = 12 cm.

Find the value of : $\sin B + \cos C$



[b] Show the type of the triangle ABC according to its angles measures if its vertices are A (– 1 , 3) , B (5 , 1) and C (6 , 4)

5 [a] Find the slope of the straight line and the length of the intercepted part from y-axis where its equation is $4x + 5y - 10 = 0$

[b] **In the opposite figure :**

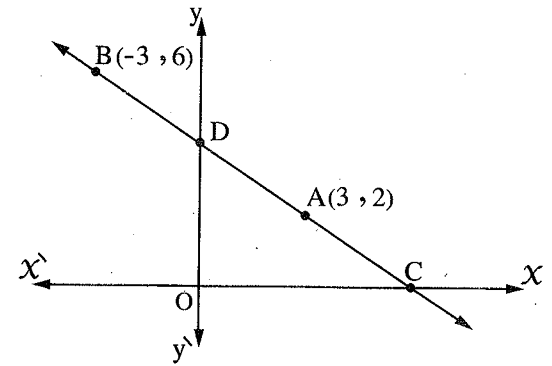
$\overleftrightarrow{CD}$ passes through the two points A (3 , 2) , B (– 3 , 6) and cuts the two axes at C and D respectively.

Find with the proof :

1 The equation of $\overleftrightarrow{CD}$



2 The area of the triangle DOC where O is the origin point.



7 El-Gharbia Governorate

Answer the following questions : (Calculator is allowed)

1 **Choose the correct answer :**

1 The perpendicular distance between the two straight lines $y - 4 = 0$ and $y + 5 = 0$ equals .... length units.

(a) 1 (b) 5 (c) 9 (d) 4



[2] The equation of the straight line passing through the point (3 , – 2) and parallel to X-axis is ....

(a) $X = 3$ (b) $y = 2$ (c) $y = -2$ (d) $X + y = 1$

[3] If the straight line whose equation is $y = k X + 1$ is parallel to the straight line whose equation is $2y - X = 0$, then k = ...

(a) 1 (b) $\frac{1}{2}$ (c) 2 (d) – 2

[4] If the lengths 3 , 7 , ℓ are lengths of sides of a triangle , then ℓ can be equal to ....

(a) 3 (b) 7 (c) 4 (d) 10

[5] The image of the point (– 3 , 5) by reflection on the y-axis is ....

(a) (3 , 5) (b) (5 , 3) (c) (– 5 , 3) (d) (– 3 , – 5)

[6] If ABC is a right-angled triangle at B , then $\frac{\sin A}{\cos C}$ = ...

(a) $\frac{3}{5}$ (b) $\frac{4}{3}$ (c) $\frac{3}{4}$ (d) 1

2 **[a]** If $\tan X = 4 \cos 60° \sin 30°$, then find the value of X where X is the measure of an acute angle.

[b] If the triangle XYZ whose vertices are X (3 , 5) , Y (4 , 2) , Z (– 5 , a) is a right-angled triangle at Y

, find : [1] The value of a

[2] The surface area of the triangle XYZ

3 **[a]** If the ratio between the two measures of two supplementary angles is 3 : 5 , find the degree measure for each of them by degrees and minutes.

[b] Find the equation of the straight line passing through the point (– 1 , 2) and perpendicular to the straight line $X + y = 5$

4 **[a]** Prove that the points A (3 , – 1) , B (– 4 , 6) , C (2 , – 2) which belong to an orthogonal Cartesian coordinates plane lie on one circle whose centre is the point M (– 1 , 2) , then find the circumference in terms of π

[b] ABCD is a trapezium in which $\overline{AD}$ // $\overline{BC}$, m (∠ B) = 90° , AB = 3 cm. , AD = 6 cm. , BC = 10 cm. **Find the value of :** cos (∠ DCB) – tan (∠ ACB)

5 **[a]** ABCD is a parallelogram in which A (3 , 2) , B (4 , – 5) , C (0 , – 3)

Find : [1] The coordinates of the intersection point of the two diagonals.

[2] The coordinates of the vertex point D

[b] In the opposite figure :

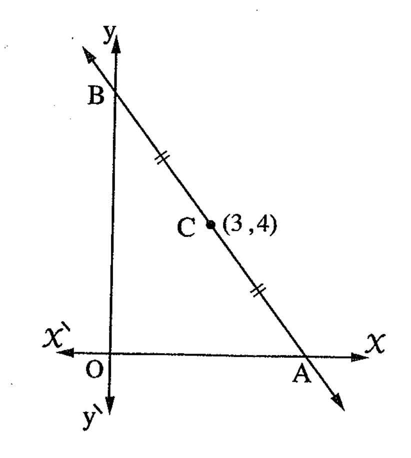
The point C is the midpoint of $\overline{AB}$

where C (3 , 4) , O is the origin point

in the perpendicular coordinate system.

Find : 1 The coordinates of the two points A and B

2 The equation of $\overleftrightarrow{AB}$



8 El-Dakahlia Governorate



Answer the following questions : (Calculator is permitted)

1 [a] Choose the correct answer from those given :

1 ABC is a triangle , m (∠ A) = 85° , sin B = cos B , then m (∠ C) = ...

(a) 30° (b) 45° (c) 50° (d) 60°

2 The area of the triangle bounded by the straight lines $X = 0$, $y = 0$, $3X + 2y = 12$ equals .... square units.

(a) 6 (b) 12 (c) 4 (d) 5

3 If the straight line passing through the two points (1 , y) , (3 , 4) its slope equals tan 45° , then y = ...

(a) 1 (b) 2 (c) – 1 (d) 4

[b] ABCD is an isosceles trapezium such that $\overline{AD}$ // $\overline{BC}$, AD = 4 cm. , AB = 5 cm. , BC = 12 cm. **Find the value of :** $\frac{\tan B \times \cos C}{\sin^2 C + \cos^2 B}$

2 [a] Choose the correct answer from those given :

1 The straight line $aX + (2 - a)y = 5$ is parallel to the straight line passing through the two points (1 , 4) , (3 , 5) , then a = ...

(a) 3 (b) – 2 (c) 6 (d) 4

2 ABC is a triangle , 2 m (∠ C) = m (∠ A) + m (∠ B) , then m (∠ C) = ...°

(a) 30 (b) 60 (c) 45 (d) 90

3 The straight line $\frac{X}{2} - \frac{y}{3} = 6$ cuts the X-axis at a part with length .... units.

(a) 3 (b) 2 (c) 6 (d) 12



[b] $\overline{AB}$ is a diameter of circle M , B (8 , 11) , M (5 , 7) **Find :**

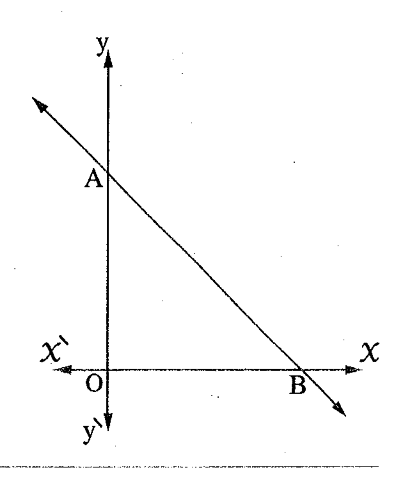
1 The circumference of the circle.

2 The equation of the straight line perpendicular to $\overline{AB}$ from point A

3 **[a] Prove that the quadrilateral ABCD whose vertices are :**

A (– 1 , 3) , B (5 , 1) , C (7 , 4) , D (1 , 6) is a parallelogram.

[b] The opposite figure represents the straight line $\overleftrightarrow{AB}$ whose equation is $y = k\,x + c$ and cuts the two axes with two equal parts and passes through the point (2 , 3) **Find :**



1 The values of k , c

2 The area of the triangle ABO

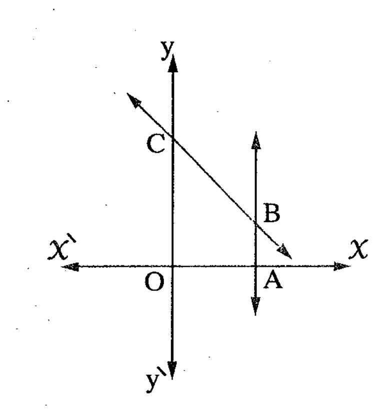
4 **[a] In the opposite figure :**

The straight line $\overleftrightarrow{AB}$ is parallel to y-axis.

The straight line $\overleftrightarrow{BC}$ its equation is $y = -x + 3$



, the point B (2 , 1) **Find :**



1 The length of $\overline{BC}$

2 The area of the figure OABC

3 m (∠ OCB)

[b] ABC is a right-angled triangle at B

1 **Prove that :** $\sin^2 A + \cos^2 A = 1$

2 If AB = 5 cm. , AC = 13 cm. , **find :** m (∠ C) to the nearest minute.

5 [a] Find the equation of the straight line passing through the point (3 , 4) and makes with the positive direction of x-axis an angle of measure 135°

[b] **Without using calculator , prove that :**

$\tan^2 60° - \tan^2 45° = \sin^2 60° + \cos^2 60° + 2 \sin 30°$



9 Ismailia Governorate



Answer the following questions : *(Calculator is allowed)*

1 Choose the correct answer from those given :

1 The number of axes of symmetry of the scalene triangle equals ....

(a) zero (b) 1 (c) 2 (d) 3

2 The midpoint of $\overline{AB}$ where A (6 , 0) , B (0 , 4) is ....

(a) (6 , 4) (b) (4 , 6) (c) (3 , 2) (d) (2 , 3)

3 If the lengths of two sides of a triangle are 3 cm. and 4 cm. , then the length of the third side may be .... cm.

(a) 1 (b) 6 (c) 7 (d) 8

4 If $\tan 2X = \frac{1}{\sqrt{3}}$ where $2X$ is the measure of an acute angle , then $X =$ .... °

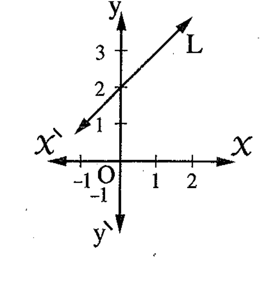
(a) 15 (b) 30 (c) 45 (d) 60

5 When you stand in front of the mirror and see your image , this is called in mathematics ....

(a) rotation. (b) translation. (c) reflection. (d) similarity.

6 **In the opposite figure :**

Which of the following represents the equation of the straight line L ?



(a) $y = X$

(b) $y = 2$

(c) $y + X = 2$

(d) $y - X = 2$

2 [a] Without using the calculator , find the value of X if :

$X \cos^2 30° = \tan^2 60° \cos^2 45°$

[b] If A (5 , – 1) , B (3 , 7) , C (1 , – 3) , find the equation of the straight line which passes through the midpoint of $\overline{BC}$ and the point A

3 [a] Prove that the points A (1 , – 2) , B (– 4 , 2) , C (1 , 6) are the vertices of an isosceles triangle.

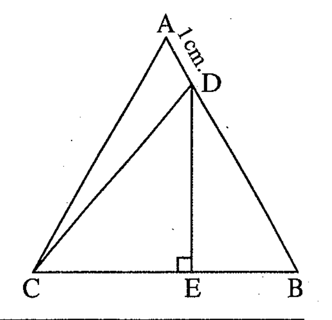
[b] ABC is a right-angled triangle at B , find the value of : $\frac{\sin A}{\cos C}$ and if $\tan D = \frac{\sin A}{\cos C}$ where D is an acute angle , **find :** m (∠ D)



4 [a] If the straight line L_1 passes through the two points (k , 1) , (2 , 4) and the straight line L_2 makes with the positive direction of X-axis an angle of measure 45°

, find the value of k if the two straight lines are parallel.

[b] **In the opposite figure :**



ABC is an equilateral triangle of side length 5 cm.

, D ∈ $\overline{AB}$ where AD = 1 cm. , $\overline{DE} \perp \overline{BC}$

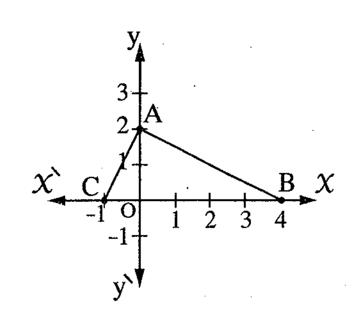
Find : tan (∠ DCE)

5 [a] If ABCD is a rhombus where A (3 , 3) , C (– 3 , – 3)

, **find :** [1] The intersection point of the diagonals.

[2] The equation of $\overleftrightarrow{BD}$

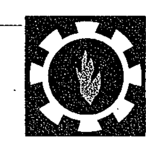
[b] **In the opposite figure :**



A triangle ABC is drawn in the orthogonal Cartesian coordinates plane.

Prove that : Δ ABC is a right-angled triangle and find its area.

10 Suez Governorate



Answer the following questions : ***(Calculator is allowed)***

1 **Choose the correct answer from those given :**

[1] $\sin^2 60° + \cos^2 60° =$ ....

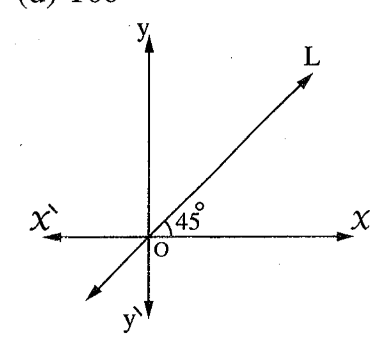
(a) 0 (b) $\frac{1}{4}$ (c) $\frac{1}{2}$ (d) 1

[2] ABCD is a parallelogram in which m (∠ A) + m (∠ C) = 200°

, then m (∠ B) = ... °

(a) 80 (b) 50 (c) 100 (d) 160

[3] **In the figure opposite :**



The equation of the straight line L is ....

(a) $X = 1$

(b) $y = -X$

(c) $y = X$

(d) y = 1



[4] If a , b are the measures of two complementary angles where a : b = 1 : 2 , then b = ...°

(a) 180 (b) 90 (c) 30 (d) 60

[5] The perpendicular distance between the straight lines $x - 2 = 0$, $x + 3 = 0$ equals .... length units.

(a) 1 (b) 5 (c) 2 (d) 3

[6] If A (0 , 0) , B (5 , 7) , C (5 , h) are the vertices of a right-angled triangle at C , then h = ...

(a) 0 (b) 5 (c) 7 (d) – 5

2 [a] **Without using calculator , prove that :**

$2 \sin 30° + 4 \cos 60° = \tan^2 60°$

[b] If A (– 1 , – 1) , B (2 , 3) , C (6 , 0) , D (3 , – 4) are four points on an orthogonal Cartesian coordinates plane

, **prove that :** $\overline{AC}$ and $\overline{BD}$ bisect each other.

3 [a] If $\cos 3x = \frac{\sin 60° \sin 30°}{\tan 45° \sin^2 45°}$, find the value of x where $3x$ is an acute angle.

[b] Find the equation of the straight line passing through the point (1 , 2) and perpendicular to the straight line passing through the two points A (2 , – 3) , B (5 , – 4)

4 [a] ABC is a right-angled triangle at C where AB = 5 cm. , BC = 4 cm.

Prove that : sin A cos B + cos A sin B = 1

[b] Find the equation of the straight line whose slope is equal to the slope of the straight line $\frac{y-1}{x} = \frac{1}{3}$ and intersects a part from the negative direction of y-axis of length 3 units.

5 [a] ABC is a triangle where A (0 , 0) , B (3 , 4) , C (– 4 , 3)

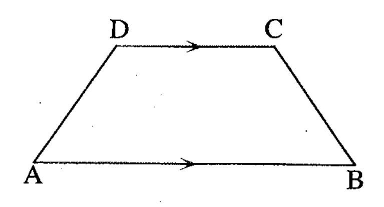
Find the perimeter of Δ ABC

[b] **In the opposite figure :**

ABCD is a trapezoid , $\overline{AB} // \overline{CD}$

, A (9 , – 2) , B (3 , 2) , C ($-x$, $-x$) , D (4 , – 3)

Find the coordinates of the point C





11 Port Said Governorate



Answer the following questions :

1 Choose the correct answer from those given :

1 If $\frac{-2}{3}$, $\frac{k}{6}$ are the slopes of two perpendicular straight lines , then k = ...

(a) 9 (b) 4 (c) – 9 (d) – 4

2 The distance between the two points (15 , 0) , (6 , 0) equals .... unit length.

(a) – 9 (b) 9 (c) 3 (d) – 3

3 ABC is a right-angled triangle at C , AB = 25 cm. , AC = 15 cm.

, then the area of the surface of the triangle ABC is .... cm^2.

(a) 300 (b) 75 (c) 150 (d) 375

4 If $\overleftrightarrow{CD}$ is parallel to the y-axis where C (m , 4) , D (– 5 , 7) , then m = ...

(a) 5 (b) – 5 (c) – 7 (d) 7

5 If the point of the origin is the midpoint of $\overline{AB}$, where A (5 , – 2) , then the point B is ....

(a) (2 , 5) (b) (5 , – 2) (c) (– 2 , – 5) (d) (– 5 , 2)

6 If tan $(X + 10) = \sqrt{3}$ where X is the measure of an acute angle , then X = ...

(a) 40° (b) 50° (c) 60° (d) 70°

2 [a] Prove that the straight line which passes through the points (– 1 , 3) , (2 , 4) is parallel to the straight line $3y - X - 1 = 0$

[b] Without using calculator , prove that :

sin 90° = sin 60° cos 30° + cos 60° sin 30°

3 [a] If $\cos E = \frac{\cos^2 45°}{\tan 30°}$, find m (∠ E) , E is an acute angle.

[b] Prove that the points A (– 3 , 0) , B (3 , 4) , C (1 , – 6) are the vertices of an isosceles triangle.

4 [a] Find the equation of the straight line whose slope is equal to the slope of the straight line $\frac{y-1}{X} = \frac{1}{3}$ and intercepts a negative part from the y-axis that is equal to 3 units.

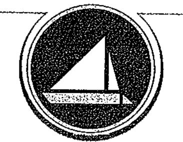
[b] ABCD is a quadrilateral , where A (2 , 3) , B (6 , 2) , C (– 2 , – 2) , D (– 2 , 1)
Prove that the figure ABCD is a trapezoid.



5 **[a]** If A $(5, -6)$, B $(3, 7)$ and C $(1, -3)$, then find the equation of the straight line passing through the point A and the midpoint of $\overline{BC}$

[b] XYZ is a right-angled triangle at Y, where XY = 5 cm. , XZ = 13 cm.
, **find the value of :** $\sin X \cos Z + \cos X \sin Z$

12 Damietta Governorate



Answer the following questions : (Calculator is allowed)

1 **Choose the correct answer from the given answers :**

1. The complement of the angle whose measure is 40° is of measure ....
(a) 50° (b) 80° (c) 90° (d) 140°

2. If D $(6, -4)$ is the midpoint of $\overline{AB}$ where A $(5, -3)$, then B is ....
(a) $(-5, 7)$ (b) $(5, 7)$ (c) $(7, 5)$ (d) $(7, -5)$

3. The length of the radius of the circle of centre $(0, 0)$ and passes through $(3, 4)$ equals .... length units.
(a) 7 (b) 1 (c) 12 (d) 5

4. The slope of the straight line $X - 5 = 0$ is ....
(a) 5 (b) $\frac{1}{5}$ (c) undefined. (d) zero

5. If $\tan (X + 10) = 1$, X is the measure of an acute angle, then $X =$ ....
(a) 45° (b) 35° (c) 80° (d) 50°

6. The perpendicular distance between the two straight lines $X - 3 = 0$, $X + 4 = 0$ equals .... length units.
(a) 1 (b) 5 (c) 2 (d) 7

2 **[a]** Find the equation of the straight line which passes through the points $(5, 0)$, $(0, 5)$

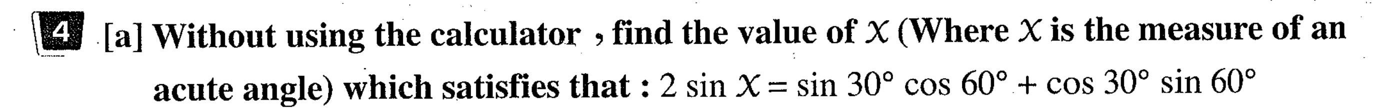
[b] ABC is a right-angled triangle at B where AB = 7 cm. , AC = 25 cm.

Find the value of the following : $\sin^2 A + \sin^2 C$

3 **[a]** If the points $(0, 1)$, $(a, 3)$, $(2, 5)$ are located on one straight line
, then find the value of a

[b] Find the equation of the straight line passing through the point $(3, 7)$ and parallel to the straight line $X + 3y + 5 = 0$





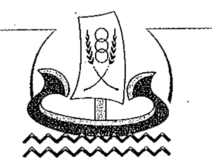
4 **[a] Without using the calculator , find the value of X (Where X is the measure of an acute angle) which satisfies that :** $2 \sin X = \sin 30° \cos 60° + \cos 30° \sin 60°$

[b] Find the equation of the straight line whose slope is 2 and intersects a positive part from the y-axis that equals 7 units.

5 **[a] Prove the following equality :** $\tan 60° = \frac{2 \tan 30°}{1 - \tan^2 30°}$

[b] State the kind of the triangle whose vertices are the points A (– 2 , 4) , B (3 , – 1) , C (4 , 5) with respect to its sides lenghts.

13 Kafr El-Sheikh Governorate



Answer the following questions : (Calculator is allowed)

1 **Choose the correct answer :**

1. The measure of an exterior angle of the equilateral triangle equals ....
   (a) 60° (b) 150° (c) 120° (d) 30°
2. If $\frac{-2}{3}$, $\frac{6}{k}$ are the slopes of two perpendicular straight lines , then k = ...
   (a) 4 (b) – 9 (c) – 4 (d) 9
3. If ABCD is a square , then m (∠ CAB) = ...
   (a) 90° (b) 45° (c) 60° (d) 630°
4. If $\sin \frac{X}{3} = \frac{1}{2}$, $\frac{X}{3}$ is the measure of an acute angle , then X = ...
   (a) 30° (b) 60° (c) 10° (d) 90°
5. The parallelogram whose two diagonals are equal in length and not perpendicular is called a ....
   (a) square. (b) rhombus. (c) rectangle. (d) trapezium.
6. The equation of the straight line which passes through the point (2 , – 3) and is parallel to X-axis is ....
   (a) $X = 2$ (b) $y = 3$ (c) $X = -2$ (d) $y = -3$

2 **[a]** Show the type of the triangle whose vertices are A (3 , 0) , B (1 , 4) , C (– 1 , 2) due to its side lengths.

[b] Without using calculator , find the value of the following :

$\sin^2 45° \cos 60° + \frac{1}{2} \tan 60° \sin 60°$



3 **[a]** If the straight line $L_1 : y = (2 - k) X + 5$ and the straight line L_2 makes with the positive direction of the X-axis an angle of measure 45°, find the value of k if $L_1 // L_2$

[b] If $\sqrt{3} \tan X = 4 \sin 60° \cos 30°$, **find :** X , where X is the measure of an acute angle.

4 **[a]** If the distance between the point $(X , 3)$ and the point $(2 , 5)$ equals $2\sqrt{2}$ length units , then find the values of X

[b] Find the equation of the straight line whose slope is 3 and passes through the point $(5 , -2)$

5 **[a]** If the midpoint of $\overline{BC}$ is A (2 , 3) , and C (– 1 , 3) , find the point B

[b] ABC is a right-angled triangle at B , sin A + cos C = 1 , **find :** m (∠ A)

14 El-Beheira Governorate



Answer the following questions : (Calculator is permitted)

1 **Choose the correct answer from the given ones :**

1. If the point of origin is the midpoint of $\overline{AB}$, where A (5 , – 2) , then the point B is ....
   (a) (– 5 , – 2) (b) (5 , 2) (c) (– 5 , 2) (d) (0 , 0)

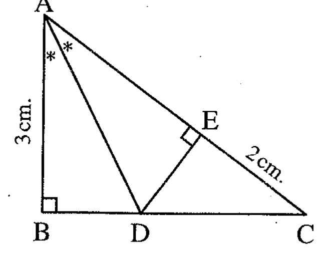
2. The angle of measure 50° is complementary with an angle of measure ....
   (a) 50° (b) 40° (c) 30° (d) 130°

3. A circle its centre is (3 , – 4) and its radius length is 5 units. Which of the following points belongs to the circle ?
   (a) (– 3 , 4) (b) (0 , 0) (c) (5 , 0) (d) (0 , 4)

4. If $\cos \frac{X}{2} = \frac{1}{2}$ where $\frac{X}{2}$ is the measure of an acute angle , then $X =$ ....
   (a) 60° (b) 120° (c) 180° (d) 90°

5. If ABCD is a parallelogram in which m (∠ A) + m (∠ C) = 220° , then m (∠ B) = ...
   (a) 110° (b) 70° (c) 140° (d) 80°

6. **In the figure opposite :**
   ABC is a right-angled triangle at B , $\overrightarrow{AD}$ bisects ∠ A , $\overline{DE} \perp \overline{AC}$, AB = 3 cm. , CE = 2 cm. , then CB = ... cm.



   (a) 2 (b) 3 (c) 4 (d) 5



2 **[a]** Prove that the straight line which passes through the two points (– 1 , 3) , (2 , 4) is parallel to the straight line $3y - X - 1 = 0$

[b] ABCD is a trapezium , $\overline{AD} // \overline{BC}$, m (∠ B) = 90° , AB = 3 cm. , BC = 6 cm. , AD = 2 cm. Find the length of $\overline{DC}$ and the value of cos (∠ BCD)

3 **[a]** Find the equation of the straight line whose slope is 3 and passes through the point (1 , 2)

[b] Without using the calculator , find the value of X (Where X is the measure of an acute angle) which satisfies that :
$2 \sin X = \tan^2 60° - 2 \tan 45°$

4 **[a]** If the straight line L_1 passes through the two points (3 , 1) , (2 , k) and the straight line L_2 makes with the positive direction of the X-axis an angle of measure 45° , then find k if the two straight lines L_1 , L_2 are perpendicular.

[b] ABC is a right-angled triangle at B , if $\sqrt{2}$ AB = AC , find the main trigonometric ratios of the angle C

5 **[a]** If A (X , 3) , B (3 , 2) , C (5 , 1) and AB = BC , $B \notin \overleftrightarrow{AC}$, then find the value of X

[b] Prove that the points A (6 , 0) , B (2 , – 4) , C (– 4 , 2) are the vertices of a right-angled triangle at B , then find the coordinates of the point D that makes the figure ABCD a rectangle.

15 El-Fayoum Governorate

Answer the following questions : (Using calculators is allowed)

1 **Choose the correct answer :**

1. The perpendicular distance between the two straight lines $X - 2 = 0$ and $X + 3 = 0$ equals .... length units.
   (a) 1 (b) 5 (c) 2 (d) 3

2. The sum of the measures of the accumulative angles at a point is ....
   (a) 90° (b) 180° (c) 270° (d) 360°

3. If $\tan (X + 10) = \sqrt{3}$, where X is the measure of an acute angle , then $X =$ ....
   (a) 60° (b) 30° (c) 50° (d) 70°

4. The polygon in which the number of its sides is equal to the number of its diagonals is the ....
   (a) quadrilateral. (b) triangle. (c) pentagon. (d) hexagon.



5 A circle of centre at the origin point and its radius length is 2 length units. Which of the following points belongs to the circle ?

(a) $(1 , -2)$ (b) $\left(-2 , \sqrt{5}\right)$ (c) $\left(\sqrt{3} , 1\right)$ (d) $(0 , 1)$

6 The square which the length of its diagonal is $8\sqrt{2}$ cm. , its area equals .... cm²

(a) 4 (b) 32 (c) 64 (d) 16

2 **[a]** Prove that the points A $(3 , -1)$, B $(-4 , 6)$, C $(2 , -2)$ which belong to an orthogonal Cartesian coordinates plane lie on the circle whose centre is M $(-1 , 2)$, and find the circumference of the circle where $\pi = 3.14$

[b] Without using calculator , prove that :

$\tan^2 60° - \tan^2 45° = \sin^2 60° + \cos^2 60° + 2 \sin 30°$

3 **[a]** Find the equation of the straight line perpendicular to $\overline{AB}$ from its midpoint where A $(1 , 3)$ and B $(3 , 5)$

[b] ABC is a right-angled triangle at B , where AC = 5 cm. , BC = 4 cm. , **find the value of :** $2 \cos^2 C + \sin^2 A$

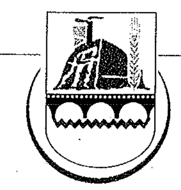
4 **[a]** Prove that the points A $(3 , -2)$, B $(-5 , 0)$, C $(0 , -7)$, D $(8 , -9)$ are the vertices of a parallelogram.

[b] Find the value of X where : $4 X = \cos^2 30° \tan^2 30° \tan^2 45°$

5 **[a]** If the two straight lines $3 X - 4 y - 3 = 0$ and $k y + 4 X - 8 = 0$ are both perpendicular , then find the value of k

[b] Find the equation of the straight line which intercepts from the two axes , two positive parts of length 1 and 4 from X and y axes respectively.

16 Beni Suef Governorate



Answer the following questions : (Calculator is allowed)

1 **Choose the correct answer from those given :**

1 $4 \sin 60° \tan 60° =$ ....

(a) 3 (b) 6 (c) 12 (d) $2\sqrt{3}$

2 The image of the point $(4 , 5)$ by the translation $(2 , 3)$ is ....

(a) $(6 , -8)$ (b) $(-8 , 6)$ (c) $(6 , 8)$ (d) $(-6 , -8)$



[3] The perpendicular distance between the two straight lines $X - 2 = 0$, $X + 3 = 0$ equals .... length units.

(a) 1 (b) 2 (c) 4 (d) 5

[4] The equation of the straight line which passes through the point (– 5 , 3) and is parallel to y-axis is ....

(a) $X = -5$ (b) $y = -5$ (c) $y = 3$ (d) $X = 3$

[5] The number of the axes of symmetry of the circle is ....

(a) zero (b) 1 (c) 2 (d) an infinite number.

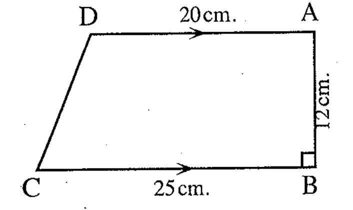
[6] The points (0 , 0) , (0 , 6) and (8 , 0) ....

(a) form an acute-angled triangle. (b) form a right-angled triangle.

(c) form an obtuse-angled triangle. (d) are collinear.

2 [a] If the point C (6 , – 4) is the midpoint of $\overline{AB}$ where A (5 , – 3) , find the coordinates of the point B

[b] **In the opposite figure :**



ABCD is a trapezium in which

$\overline{AD} \parallel \overline{BC}$, m (∠ B) = 90°

, AD = 20 cm. , AB = 12 cm. and BC = 25 cm.

Find the length of $\overline{DC}$ and m (∠ C)

3 [a] **Prove that :** $\frac{1}{2}$ sin 60° = sin 30° cos 30°

[b] Find the equation of the straight line which passes through the point (2 , 3) and its slope = 2

4 [a] If cos E tan 30° = $\sin^2$ 45°

, find m (∠ E) where E is an acute angle.

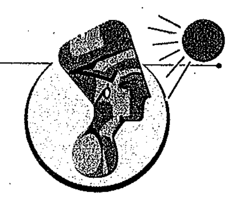
[b] Prove that the straight line which passes through the two points (2 , – 1) and (6 , 3) is parallel to the straight line which makes a positive angle of measure 45° with the positive direction of X-axis.

5 [a] Prove that the points A (3 , – 1) , B (– 4 , 6) and C (2 , – 2) are located on a circle whose centre is M (– 1 , 2)

[b] Find the slope of the straight line $3y - 2X + 5 = 0$, then find the length of the intersected part from the y-axis.



17 El-Menia Governorate



Answer the following questions : ***(Calculator is allowed)***

1 Choose the correct answer from those given :

1. The angle whose measure is 65° complements an angle of measure ....°
   (a) 35 (b) 25 (c) 115 (d) 45
2. ABCD is a parallelogram. If m (∠ A) + m (∠ C) = 200° , then m (∠ B) = ...°
   (a) 50 (b) 80 (c) 100 (d) 160
3. The sum of lengths of any two sides in a triangle is .... the length of the third side.
   (a) less than (b) equal to (c) greater than (d) twice
4. If $\sin X = \frac{1}{2}$, then m (∠ X) = ...° , X is an acute angle.
   (a) 45 (b) 60 (c) 90 (d) 30
5. The distance between the two points (3 , 0) , (0 , – 4) equals .... length units.
   (a) 4 (b) 5 (c) 6 (d) 7
6. If $x + y = 5$, $k x + 2 y = 0$ are two parallel straight lines , then k = ...
   (a) – 2 (b) – 1 (c) 1 (d) 2

2 **[a] Without using calculator , find the value of the expression :**

$\cos 60° \sin 30° - \sin 60° \tan 60° + \cos^2 30°$

[b] Find the equation of the straight line which passes through the point (1 , 2) and is perpendicular to the straight line which passes through the two points A (2 , – 3) , B (5 , – 4)

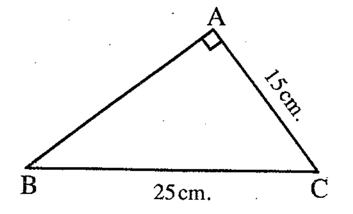
3 **[a] Without using calculator , find the value of x which satisfies :**

$2 \sin x = \tan^2 60° - 2 \tan 45°$ where x is the measure of an acute angle.

[b] In Δ ABC , m (∠ A) = 90° , AC = 15 cm. , BC = 25 cm.

Prove that :

cos C cos B – sin C sin B = zero



4 **[a]** Prove that the points A (– 1 , – 4) , B (1 , 0) and C (2 , 2) are collinear.

[b] If C (6 , – 4) is the midpoint of $\overline{AB}$ where A (5 , – 3) , find the coordinates of the point B



5 **[a]** Prove that the straight line that makes an angle of measure 45° with the positive direction of the X-axis is parallel to the straight line whose equation is $X - y - 1 =$ zero

[b] Find the value of a if the distance between the two points (a , 7) and (– 2 , 3) equals 5 length units.

18 Assiut Governorate

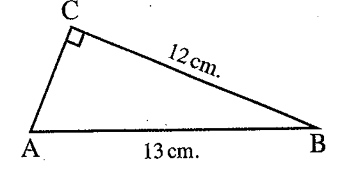


Answer the following questions : *(Calculator is permitted)*

1 **Choose the correct answer :**

1. The measure of the straight angle is ....°
   (a) 90 (b) 360 (c) 180 (d) 240
2. If $\tan (X + 20)° = \sqrt{3}$ where $(X + 20)°$ is the measure of an acute angle , then $X =$ ....
   (a) 30 (b) 60 (c) 90 (d) 40
3. The length of the side opposite to the angle of measure 30° in the right-angled triangle equals .... the length of the hypotenuse.
   (a) $\frac{1}{4}$ (b) twice (c) $\frac{1}{2}$ (d) $\frac{1}{3}$
4. If $X + y = 5$, $k X + 2 y = 7$ are perpendicular , then k = ...
   (a) – 2 (b) – 1 (c) 1 (d) 2
5. The area of the rhombus whose diagonals lengths are 6 cm. and 12 cm. is .... cm^2.
   (a) 16 (b) 30 (c) 36 (d) 72
6. The perpendicular distance between the two straight lines $X - 3 = 0$, $X + 4 = 0$ equals .... length units.
   (a) 2 (b) 7 (c) 12 (d) 6

2 **[a] In the opposite figure :**



ABC is a right-angled triangle at C , AB = 13 cm.
, BC = 12 cm.
Prove that : sin A cos B + cos A sin B = 1

[b] Show the type of the triangle whose vertices are A (1 , 1) , B (5 , 1) , C (3 , 4) due to its side lengths.

3 **[a]** If $2 \sin X = \tan^2 60° - 4 \sin 30°$, find X , where X is the measure of an acute angle.

[b] ABCD is a parallelogram where A (3 , 2) , B (4 , – 5) , C (1 , 4) , find the two coordinates of the point at which the two diagonals intersect , then find the coordinates of the point D



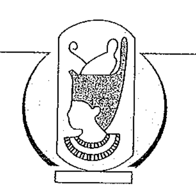
4 **[a] Without using the calculator , find the value of :** $\cos 60° + \cos^2 30° + \tan^2 45°$

[b] Prove that the straight line passing through the two points $(2\sqrt{3}, 3)$, $(\sqrt{3}, 4)$ is perpendicular to the straight line that makes with the positive direction of the X-axis an angle of measure 60°

5 **[a]** Find the equation of the straight line passing through the point (3 , – 5) and parallel to the straight line $X + 3y = 7$

[b] Find the slope of the straight line and the length of the y-intercept by the straight line $\frac{y-1}{X} = \frac{1}{2}$

19 Souhag Governorate



Answer the following questions : (Calculator is permitted)

1 **Choose the correct answer :**

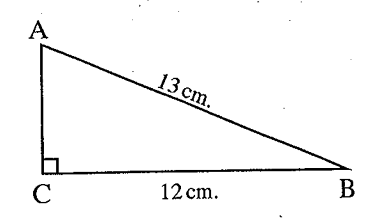
1. The point of concurrence of the medians of the triangle divides each median in the ratio of .... from its base.
   (a) 2 : 3 (b) 2 : 1 (c) 1 : 2 (d) 3 : 2
2. If $\sin X = \cos X$, then X = ...° (X is the measure of an acute angle)
   (a) 30 (b) 45 (c) 60 (d) 90
3. The sum of the measures of the accumulative angles at a point equals ....°
   (a) 30 (b) 60 (c) 180 (d) 360
4. The distance between the two points (3 , 0) , (– 1 , 0) equals .... length units.
   (a) 4 (b) 5 (c) 6 (d) 7
5. The side length of a square is $\sqrt{3}$ cm. , then its area = ... cm^2
   (a) $4\sqrt{3}$ (b) 9 (c) 3 (d) 6
6. If A (5 , – 3) , B (7 , – 5) , then the midpoint of $\overline{AB}$ is ....
   (a) (3 , 5) (b) (2 , 0) (c) (5 , – 5) (d) (6 , – 4)

2 **[a]** If $\cos X = 2\cos^2 30° - 1$ (X is the measure of an acute angle) , **find :** X

[b] Prove that the triangle whose vertices are A (1 , 4) , B (– 1 , – 2) , C (2 , – 3) is right-angled at B



3 **[a] In the opposite figure :**



The triangle ABC is right-angled at C

, AB = 13 cm. , BC = 12 cm.

Find : 1 The length of $\overline{AC}$

2 The value of sin A cos B + cos A sin B

[b] Find the equation of the straight line whose slope equals 2 and passes through the point (1 , 0)

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4 **[a] Without using the calculator , prove that :** $2 \sin 30° = \tan^2 60° - 2 \tan 45°$

[b] Find the equation of the straight line passing through the points (1 , 3) , (– 1 , – 3) , then prove that it passes through the origin point.

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5 **[a]** Prove that the points A (– 3 , – 1) , B (6 , 5) , C (3 , 3) are collinear.

[b] Prove that the straight line passing through the two points (– 3 , – 2) , (4 , 5) is parallel to the straight line which makes with the positive direction of the X-axis an angle of measure 45°

20 Qena Governorate



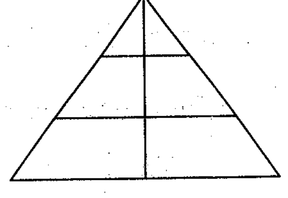
Answer the following questions :

1 **Choose the correct answer :**

1 If $\sin X = \frac{1}{2}$ where X is the measure of an acute angle , then $\sin 2X =$ ....

(a) $\frac{1}{4}$ (b) $\frac{\sqrt{3}}{2}$ (c) 60 (d) $\frac{1}{\sqrt{3}}$

2 The number of quadrilaterals in the opposite figure is ....



(a) 3 (b) 6

(c) 9 (d) 12

3 If the two straight lines $X + y = 4$, $a X + 3 y = 0$ are perpendicular , then a = ...

(a) – 3 (b) – 1 (c) 1 (d) 3

4 The number of axes of symmetry of the rhombus equals ....

(a) 1 (b) 2 (c) 3 (d) 4

5 The straight line whose equation is $2 y = 3 X - 6$ intercepted a part equal .... units from y-axis.

(a) 6 (b) 2 (c) 3 (d) $\frac{3}{2}$



6 The image of the point (– 3 , 2) by reflection on the origin point is ....

(a) (3 , 2) (b) (3 , – 2) (c) (– 3 , – 2) (d) (– 3 , 2)

2 [a] Δ ABC is a right-angled triangle at B , AC = 10 cm. , BC = 8 cm.

Prove that : $\sin^2 A + 1 = 2\cos^2 C + \cos^2 A$

[b] Prove that the points A (1 , 1) , B (0 , – 1) , C (2 , 3) are collinear.

3 [a] If $\sin X \tan 30° = \sin^2 45°$, find the value of X in degrees , where X is the measure of an acute angle.

[b] Prove that the straight line passing through (– 1 , 3) , (2 , 4) is parallel to the straight line whose equation is $3y - X - 1 = 0$

4 [a] **Without using calculator , prove that :** $\sin 60° = 2 \sin 30° \cos 30°$

[b] ABCD is a quadrilateral in which :

A (5 , 3) , B (6 , – 2) , C (1 , – 1) , D (0 , 4)

Prove that : ABCD is a rhombus and find its area.

5 [a] Prove that the points A (– 3 , 0) , B (3 , 4) , C (1 , – 6) are the vertices of an isosceles triangle its vertex A , then find the length of the perpendicular segment from A to $\overline{BC}$

[b] ABCD is a parallelogram in which A (3 , 2) , B (4 , – 5) , C (0 , – 3)

Find the coordinates of the point D

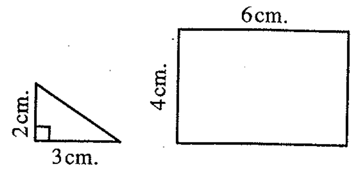
21 Luxor Governorate



Answer the following questions :

1 **Choose the correct answer :**

1 The number of the right triangles which completely cover the surface of the rectangle equals ....



(a) 10 (b) 8

(c) 6 (d) 4

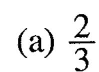
2 If m ($\angle$ A) = 85° and sin B = cos B in Δ ABC , then m ($\angle$ C) = ...°

(a) 30 (b) 45 (c) 50 (d) 60

3 The image of the point (– 5 , 6) by translation (3 , – 2) is ....

(a) (– 4 , – 2) (b) (4 , 2) (c) (– 2 , 4) (d) (– 2 , – 4)



 **In the opposite figure :**

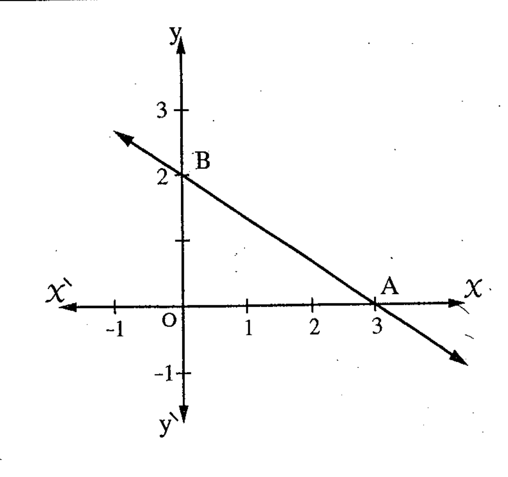
The slope of $\overleftrightarrow{AB}$ equals ....

(a) $\frac{2}{3}$

(b) $\frac{-2}{3}$

(c) $\frac{3}{2}$

(d) $\frac{-3}{2}$



5 The measure of the exterior angle at any vertex of an equilateral triangle equals ....°

(a) 30 (b) 60 (c) 90 (d) 120

6 If C (– 3 , y) is the midpoint of $\overline{AB}$ where A (X , – 6) and B (9 , – 12) , then y – X = ...

(a) 7 (b) 9 (c) 6 (d) – 18

2 **[a]** If the distance between the two points (a , 5) , (3 a – 1 , 1) equals 5 length units , then find a

[b] If $3 \tan X - 4 \sin^2 30° = 8 \cos^2 60°$, find X where X is the measure of an acute angle.

3 **[a]** Find the equation of the straight line passing by (1 , 2) and parallel to the straight line $2X + 3y - 6 = 0$

[b] Find the measure of the angle made by the straight line passing by the two points $\left(-2, \sqrt{3}\right)$, $\left(1, 4\sqrt{3}\right)$ with the positive direction of the X-axis.

4 **[a]** $\overline{AB}$ is a diameter of the circle M where A (4 , – 1) , B (– 2 , 7) , find the radius length of the circle and find its area.

[b] ABC is a triangle where AB = AC = 10 cm. , BC = 12 cm. , draw $\overline{AD} \perp \overline{BC}$ and intersects it at D **Prove that :**

1 $\sin^2 C + \cos^2 C = 1$ 2 $\sin B + \cos C > 1$

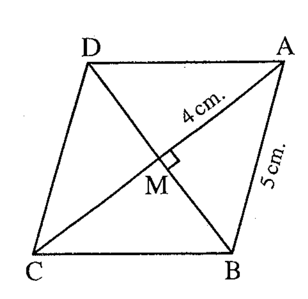
5 **[a]** If $\overleftrightarrow{AB}$ // the y-axis where A (X , 7) , B (3 , 5) , find the value of X

[b] In the opposite figure :

ABCD is a rhombus , its two diagonals intersect at M , if AB = 5 cm. , AM = 4 cm. , **find :**

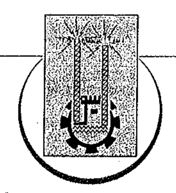
1 m (∠ BAD)

2 The area of the rhombus ABCD





22 Aswan Governorate



Answer the following questions : (Calculator is allowed)

1 Choose the correct answer from those given :

1 The angle with measure 65° is complement of an angle with measure ....

(a) 135° (b) 115° (c) 25° (d) 15°

2 If $\overleftrightarrow{AB} \perp \overleftrightarrow{CD}$ and the slope of $\overleftrightarrow{AB} = \frac{1}{2}$, then the slope of $\overleftrightarrow{CD}$ = ...

(a) 2 (b) – 2 (c) $\frac{1}{2}$ (d) $-\frac{1}{2}$

3 If C ∈ the axis of symmetry of $\overline{AB}$, then CA .... CB

(a) ⊥ (b) < (c) > (d) =

4 If 3 cm. , 7 cm. and y are lengths of sides of a triangle , then y = ... cm.

(a) 3 (b) 4 (c) 7 (d) 10

5 The distance between the two points (6 , 0) and (0 , 8) equals .... length units.

(a) 6 (b) 8 (c) 10 (d) 14

6 If $\tan(X + 10) = \sqrt{3}$ where X is the measure of an acute angle , then X = ...

(a) 80° (b) 50° (c) 35° (d) 20°

2 **[a]** If $2 \sin X = \tan^2 60° - 2 \tan^2 45°$, find the value of X where X is the measure of an acute angle.

[b] Find the equation of the straight line which is perpendicular to $\overline{AB}$ from its midpoint where A (1 , 3) and B (3 , 5)

3 **[a]** If C (4 , 2) is the midpoint of $\overline{AB}$ where A (2 , 4) and B (6 , y) , find the value of y

[b] If the points A (– 1 , – 1) , B (2 , 3) , C (6 , 0) are the vertices of a triangle.
, **prove that :** Δ ABC is right-angled at B

4 **[a]** XYZ is a right-angled triangle at Y , if XY = 5 cm. , XZ = 13 cm.
, **find :** 1 tan X × tan Z 2 cos X cos Z – sin X sin Z

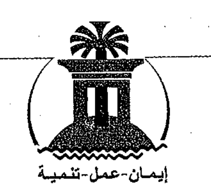
[b] Find the equation of the straight line which intercepts from the positive parts of the coordinates axes two parts of lengths 1 and 4 from X and y axes respectively.

5 **[a]** Prove that the straight line which passes through the two points (– 1 , 3) and (2 , 4) is parallel to the straight line whose equation is $3y - X - 1 = 0$

[b] Δ ABC is a right-angled triangle at B , if $2 AB = \sqrt{3} AC$
, find the main trigonometric ratios of the angle C



23 New Valley Governorate

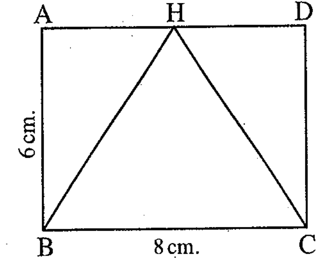


Answer the following questions : ***(Calculator is allowed)***

1 Choose the correct answer from those given :

1. The quadrilateral ABCD in which AB > CD , $\overline{AB}$ // $\overline{CD}$ is ....
   (a) a square. (b) a rectangle. (c) a rhombus. (d) a trapezium.

2. **In the opposite figure :**



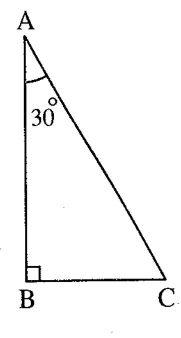
   ABCD is a rectangle , AB = 6 cm. , BC = 8 cm.
   , H ∈ $\overline{AD}$, the area of Δ HBC = ... cm^2.
   (a) 14 (b) 24
   (c) 28 (d) 48

3. For any angle A , $\frac{\sin A}{\cos A}$ = ...
   (a) sin A (b) cos A (c) tan A (d) 1

4. If ABCD is a rectangle , A (1 , 0) , C (4 , 4) , then BD = ... length units.
   (a) 5 (b) 8 (c) 9 (d) 10

5. If $x + y = 5$ and $k\,x + 2\,y = 1$ are perpendicular , then k = ...
   (a) 2 (b) 1 (c) – 1 (d) – 2

6. **In the opposite figure :**



   BC : AC : AB = ...
   (a) $1 : \sqrt{3} : 2$
   (b) $2 : \sqrt{3} : 1$
   (c) $1 : 2 : \sqrt{3}$
   (d) $\sqrt{3} : 1 : 2$

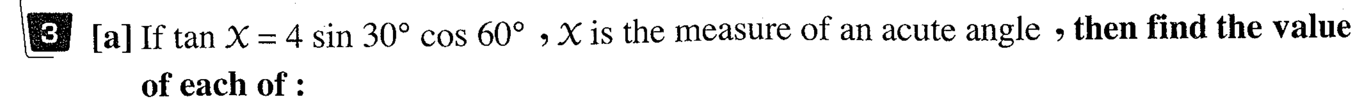
2

[a] XYZ is a right-angled triangle at Z , XZ = 3 cm. , YZ = 4 cm. **Find the value of :**

1. tan X tan Y
2. $\sin^2 X + \cos^2 X$

[b] Determine the type of the triangle whose vertices are A (3 , 3) , B (1 , 5) , C (1 , 3) according to its side lengths and according to its angles.

3



[a] If $\tan x = 4 \sin 30° \cos 60°$, x is the measure of an acute angle , **then find the value of each of :**

1. x
2. $\sin x$

[b] Find the equation of the straight line whose slope is 2 and passes through the point (1 , 0)

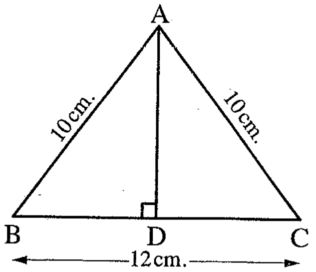


4 **[a] In the opposite figure :**

ABC is a triangle , AB = AC = 10 cm.

, BC = 12 cm. , $\overline{AD} \perp \overline{BC}$ **Find the value of :**

1 cos B 2 m (∠ B) 3 sin (90° – B)



[b] ABCD is a rhombus , A (– 2 , 3) , B (– 1 , – 2) , C (4 , – 3)

Find : 1 The coordinates of the point of intersection of its diagonals.

2 The coordinates of the point D

5 **[a]** If the straight line L_1 passes through the points (2 , 1) , (3 , k) and the straight line L_2 makes with the positive direction of the X-axis an angle of measure 45° , find the value of k ; if $L_1 // L_2$

[b] Find the equation of the straight line which intersects from the two axes two positive parts of lengths 2 and 4 from X and y axes respectively.

24 South Sinai Governorate



Answer the following questions :

1 **Choose the correct answer from those given :**

1 If $\cos (X + 15°) = \frac{1}{2}$, then $\tan X =$ .... where X is the measure of an acute angle.

(a) 1 (b) $\sqrt{3}$ (c) $\frac{\sqrt{3}}{3}$ (d) $\frac{1}{2}$

2 The distance between the two points (– 3 , 0) and (0 , – 4) equals .... length units.

(a) 4 (b) 5 (c) 3 (d) 2

3 If A = (– 4 , 5) and B = (– 2 , – 1) , then the midpoint of $\overline{AB}$ is ....

(a) (0 , 1) (b) (– 3 , 3) (c) (– 3 , 2) (d) (1 , 0)

4 ABC is a triangle in which m (∠ A) = 120° , AB = AC , then m (∠ C) = ...

(a) 60° (b) 45° (c) 50° (d) 30°

5 If X + y = 5 and k X + 2 y = 0 are two straight lines perpendicular , then k = ...

(a) – 2 (b) 2 (c) – 1 (d) 1

6 ABC is a right-angled triangle at A and $\overline{AD} \perp \overline{BC}$, where D ∈ $\overline{BC}$, then $(AD)^2$ = ...

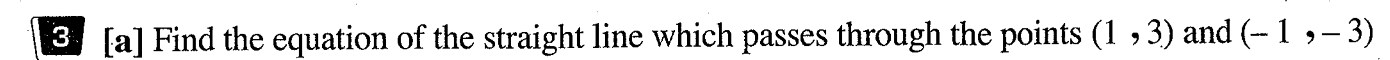
(a) BD × BC (b) CD × CB (c) DB × DC (d) $(DB)^2 \times (DC)^2$

2 **[a] Without using calculator , prove that :** $\cos 60° = \cos^2 30° - \sin^2 30°$

[b] If the point D = (1 , – 3) is the midpoint of $\overline{AB}$, A = (4 , – 3)

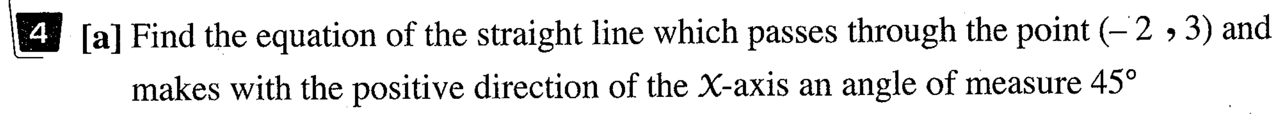
, find the coordinates of the point B





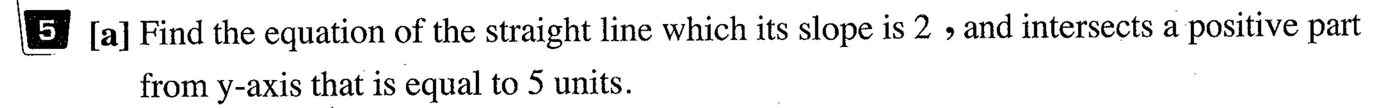
3 **[a]** Find the equation of the straight line which passes through the points (1 , 3) and (– 1 , – 3)

[b] Show the type of the triangle ABC whose vertices are A = (3 , 3) , B = (1 , 5) and C = (1 , 3) due to its side lengths.



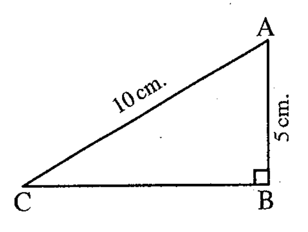
4 **[a]** Find the equation of the straight line which passes through the point (– 2 , 3) and makes with the positive direction of the X-axis an angle of measure 45°

[b] Find the value of : $\frac{2 \tan 45°}{1 + \tan^2 45°}$



5 **[a]** Find the equation of the straight line which its slope is 2 , and intersects a positive part from y-axis that is equal to 5 units.

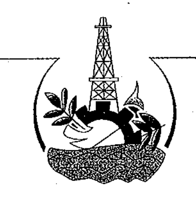
[b] In the opposite figure :



ABC is a triangle right-angled at B , in which AC = 10 cm. , AB = 5 cm.

Find : 1 m (∠ C) 2 $\sin^2 C + \cos^2 C$

25 North Sinai Governorate



Answer the following questions :

1 **Choose the correct answer from those given :**

1 If $\sin X = \frac{1}{2}$ where X is the measure of an acute angle , then X = ...

(a) 90° (b) 60° (c) 45° (d) 30°

2 The measure of the exterior angle of the equilateral triangle equals ....

(a) 60° (b) 90° (c) 120° (d) 180°

3 The slope of the straight line which makes with the positive direction of X-axis a positive angle of measure 45° equals ....

(a) 1 (b) – 1 (c) zero (d) 1.4

4 The angle whose measure is 40° complements an angle of measure ....

(a) 30° (b) 140° (c) 50° (d) 40°

5 If A (2 , – 2) , B (– 2 , 2) , then the midpoint of $\overline{AB}$ is ....

(a) (– 1 , 1) (b) (1 , – 1) (c) (4 , – 4) (d) (0 , 0)

6 If 3 , 7 , ℓ are the lengths of the sides of a triangle , then ℓ can be equal to ....

(a) 3 (b) 4 (c) 7 (d) 10

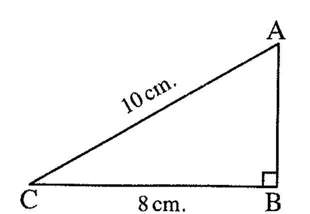
2 **[a] Prove that :** $\cos 60° = 2 \cos^2 30° - 1$ (Without using the calculator)

[b] Prove that the triangle whose vertices are A (1 , – 2) , B (– 4 , 2) and C (1 , 6) is an isosceles triangle.

3 **[a]** Find the equation of the straight line whose slope = 2 and cuts 7 units from the positive part of y-axis.

[b] In the opposite figure :

ABC is a right-angled triangle at B in which AC = 10 cm.
, BC = 8 cm.



1 **Find the length of :** $\overline{AB}$

2 **Prove that :** $\sin^2 A + \cos^2 A = 1$

4 **[a]** If $\cos X = \frac{\sin 60° \sin 30°}{\sin^2 45°}$
, find the value of X where X is the measure of an acute angle. (Without using the calculator)

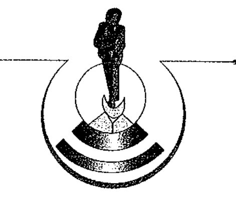
[b] Find the equation of the straight line passing through the point (1 , 2) and perpendicular to the straight line passing through the two points (2 , – 3) , (5 , – 4)

5 If A (3 , – 1) , B (– 4 , 6) , C (2 , – 2) and M (– 1 , 2) :

1 Prove that the points A , B , C lie on the circle whose centre is M

2 Find the circumference of the circle M ($\pi = 3.14$)

26 Red Sea Governorate



Answer the following questions :

1 **Choose the correct answer from those given :**

1 If A (5 , 7) , B (1 , – 1) , then the midpoint of $\overline{AB}$ is ....

(a) (2 , 3) (b) (3 , 3) (c) (3 , 2) (d) (3 , 4)

2 A rhombus whose diagonals lengths are 6 cm. , 8 cm. , then its area is .... cm^2

(a) 48 (b) 28 (c) 24 (d) 14

3 If $\cos X = \frac{\sqrt{3}}{2}$ where X is the measure of an acute angle , then $\sin 2X =$ ....

(a) $\frac{\sqrt{3}}{2}$ (b) 1 (c) – 2 (d) $\frac{1}{\sqrt{3}}$

4 If the lengths of two sides of an isosceles triangle are 5 cm. and 13 cm. , then the length of the third side is .... cm.

(a) 5 (b) 8 (c) 13 (d) 16



5 If the two straight lines $3X - 4y = 3$ and $4X + ky = 8$ are perpendicular , then k = ...

(a) 4 (b) 3 (c) – 4 (d) – 3

6 The number of axes of symmetry of the equilateral triangle equals ....

(a) zero (b) 1 (c) 2 (d) 3

2 [a] **Without using calculator , prove that :** $\sin 60° = 2 \sin 30° \cos 30° \tan 45°$

[b] Find the equation of the straight line which passes through the two points (4 , 2) , (– 2 , – 1)

3 [a] Find the value of X if $\tan X = 4 \cos 60° \sin 30°$ where X is the measure of an acute angle.

[b] Prove that the points A (2 , 4) , B (– 3 , 0) and C (– 7 , 5) are the vertices of a right-angled triangle , then find its area.

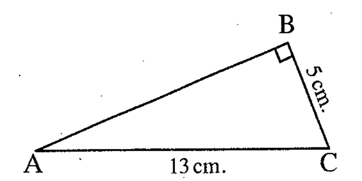
4 [a] Find the equation of the straight line which its slope is 2 and intercepts from the positive part of y-axis 7 length units.

[b] **In the opposite figure :**

ABC is a right-angled triangle at B

, AC = 13 cm. , BC = 5 cm.

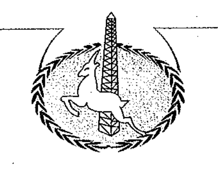
Find the value of : $\sin A \cos C + \cos A \sin C$



5 [a] If the distance between the two points (X , 7) , (– 2 , 3) equals 5 length units , find the value of X

[b] If the straight line L_1 passes through the two points (3 , 1) , (2 , k) and the straight line L_2 makes with the positive direction of the X-axis a positive angle its measure is 45° , find the value of k if $L_1 // L_2$

27 Matrouh Governorate



Answer the following questions : ***(Calculator is allowed)***

1 Choose the correct answer from those given :

1 If $\cos 2X = \frac{1}{2}$, then m ($\angle X$) = ...

(a) 15° (b) 30° (c) 45° (d) 60°

2 The angle measured 37° is complemented by an angle of measurement ....

(a) 53° (b) 143° (c) 37° (d) 90°



3 If $\frac{-2}{3}$, $\frac{k}{2}$ are the slopes of two parallel straight lines , then k = ...

(a) $\frac{-4}{3}$ (b) $\frac{-3}{4}$ (c) 3 (d) $\frac{1}{3}$

4 The area of the circle equals ....

(a) π r (b) 2 π r (c) πr^2 (d) 2 πr^2

5 In Δ ABC , AB + BC .... AC

(a) > (b) ≥ (c) < (d) ≤

6 If $\overline{AB}$ is a diameter of a circle , where A (3 , – 5) , B (5 , 1) , then the centre of the circle is ....

(a) (8 , – 2) (b) (4 , 2) (c) (2 , 2) (d) (4 , – 2)

2 **[a] Without using calculator , prove that :**

$$\tan 60° = \frac{2 \tan 30°}{1 - \tan^2 30°}$$

[b] Prove that the points A (6 , 0) , B (2 , – 4) , C (– 4 , 2) are the vertices of a right-angled triangle at B

3 **[a]** If the distance between the two points (a , 7) and (– 2 , 3) equals 5 length units , find the value of a

[b] ABC is a right-angled triangle at B , AB = 3 cm. , BC = 4 cm.

Find the value of : sin A cos C + cos A sin C

4 **[a]** If A , B are the measures of two complementary angles

, where A : B = 1 : 2

, **find :** sin A + cos B

[b] Find the slope and the intercepted part of y-axis of the straight line whose equation is $\frac{x}{2} + \frac{y}{2} = 1$

5 **[a]** If C is the midpoint of $\overline{AB}$, where A = (x , – 6) , B = (9 , – 12) and C = (– 3 , y) , find the values of x , y

[b] Find the equation of the straight line passing through the point (3 , – 5) and parallel to the straight line $x + 2y = 7$

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